THE PENNY CYCLOPÆDIA

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VOLUME VII.

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CHARLESTON, the largest city in the state of South Carolina, is situated in the county of Charleston, upon a narrow tongue of land formed by the confluence of the rivers Ashley and Cooper, in 32° 47′ N. lat. and 79° 48′ W. long. The harbour, which is spacious and convenient, is formed by the æstuary of the two rivers, and protected from the Atlantic by Sullivan's Island on the N. and Folly Island on the S. The entrance, which is between these islands, is obstructed by a range of sand-banks, which make three channels by which vessels of considerable burthen may enter the port, but the passage is rendered so difficult and uncertain by the tides and the shifting of the sands, that it is customary for all vessels, including even constant traders to the port, to be taken in by licensed pilots.

Charleston was founded in 1680, seventeen years after the granting of the colony by Charles II. to the Earl of Clarendon. For rather more than a century it was the capital of the province, Columbia, now the seat of government, not having been founded until 1787. The town is regularly laid out in parallel streets extending between the two rivers and crossed by other streets at right angles. The houses are for the most part spacious and lofty, and furnished with balconies and verandahs, in order to protect the interior from the sun. The streets are generally narrow and unpaved, and the soil being sandy, considerable annoyance is experienced in windy weather from dust and sand. To shelter the passengers from the sun, rows of a tree called the 'pride of India' are planted on each side of the streets; this tree does not grow to any considerable height, but its branches are spreading and its foliage thick, and it possesses the further advantage of not harbouring insects.

The town contains a city-hall, exchange, custom-house, guard-houses, theatre, orphan-house, hospital, alms-house, two arsenals, two markets, a college, and nineteen places of public worship. The yellow fever has made frequent ravages in Charleston, but its effects have been chiefly confined to strangers, and especially those from more northern climates. The place is not considered unhealthy by natives,

The population of the city, in 1790, was 16,359, of whom 7684 were slaves, In the next forty years the number of inhabitants has nearly doubled, as appears from the following statement:

	Free Whites. Males.	Free Whites. Females.	Free Persons of Colour.	Slaves.	Total
1800	..	..	..	..	18,712
1810	5863	5705	1472	11,671	24,711
20	5809	5330	1475	12,652	25,356
30	6326	6502	2107	15,354	30,289

These numbers do not include the population of the suburbs, which in 1830 amounted to 10,054.

Charleston is a place of very considerable trade. A great part of the cotton and nearly all the rice exported from the state are shipped from this port. The amount of registered and licensed tonnage belonging to the port in 1835 was 13,759 tons, of which 7559 tons were employed in the coasting trade. The tonnage of steam-vessels in the same year was 1889. In the year ended 30th September, 1835, the vessels that entered and left the port in the prosecution of foreign trade were—

	Inwards.		Outwards.	
	Ships.	Tons.	Ships.	Tons.
American	115	22,466	186	48,703
Foreign	127	30,938	133	33,476
Total . . .	242	53,404	319	82,179

The trade of Charleston in the two principal articles of export during the last seven years has been as follows—the season for shipping cotton and rice is considered to begin on the 1st of October, and to end on the 1st of April following

Years.	Arrivals. Cotton. Sea Island.	Arrivals. Cotton. Upland.	Arrivals. Rice.	Exports. Cotton. Sea Island.	Exports. Cotton. Upland.	Exports. Rice.	Stocks on hand. Cotton. Sea Island.	Stocks on hand. Cotton. Upland.	Stocks on hand. Rice.
	Bales.	Bales.	Tierces.	Bales.	Bales.	Tierces.	Bales.	Bales.	Tierces.
1829-30	11,538	149,250	83,356	6,651	119,209	76,503	6,784	32,4[illegible]	11,280
1830-31	11,420	118,051	81,334	9,042	89,415	63,509	7,[illegible]8	[illegible]0,843	13,888
1831-32	14,922	139,020	98, 83	11,548	115,389	82,8 5	4,277	31,273	11,731
1832-33	17,914	133,3[illegible]7	99,689	16,280	119,430	85,102	9,124	16,424	12,918
1833-34	12,500	138,382	88,605	8,639	121,314	75,4[illegible]	4,39[illegible]	20,944	11,776
1834-35	11,37[illegible]	135,482	89,328	7,925	121,899	82,571	4,665	16,1[illegible]	5,400
1835-36	10,958	163,6[illegible]9	94,000	8,144	156,837	83,013	3,0[illegible]	11,284	9,003

The exports of the two shipping seasons ending April 1, 1835, and 1836, were distributed as follows:

Countries and Ports.	From October 1, 1834, to April 1, 1835. Cotton. Sea Island.	From October 1, 1834, to April 1, 1835. Cotton. Upland.	From October 1, 1834, to April 1, 1835. Rice.	From October 1, 1835, to April 1, 1836. Cotton. Sea Island.	From October 1, 1835, to April 1, 1836. Cotton. Upland.	From October 1, 1835, to April 1, 1836. Rice.
	Bales.	Bales.	Tierces.	Bales.	Bales.	Tierces.
Liverpool	4,891	44,905	4,912	5,507	53,279	5,278
London	..	1,928	6,075	..	2,155	4,392
Greenock and Glasgow	662	7,379	6	331	6,747	14
Hâvre	1,647	20,289	4,153	1,982	33,193	3,248
Other Ports in France	106	5,297	881	..	7,346	9,739
Holland	..	7,912	10,052	..	8,322	9,703
North of Europe . .	..	809	11,139	..	7,327	16,653
Other Foreign Ports .	..	3,944	2,084	..	4,400	95
West Indies	..	..	13,340	..	3	13,924
Total Foreign Ports	7,306	92,463	52,642	7,820	122,792	56,941
Ports in the United States . . .	619	29,436	29,929	324	34,047	26,072
Total . . .	7,925	121,899	82,571	8,144	156,839	83,013

The Ashley and Cooper rivers are not navigable to any considerable distance from their mouths. To remedy this disadvantage a canal has been cut connecting the Cooper with the Santee river. The internal communication has been greatly improved by means of a railroad from Charles-

ton to Hamburg on the Savannah, opposite to Augusta, a distance of 136 miles. This railroad was opened in 1834, and has proved very successful.

The Charleston college was chartered in 1785, but until 1824 it could be considered only as a grammar-school. In that year some alterations were made in its plans and government by means of which it was placed on a respectable footing as a college. At that time its funds had become very low, but it has since received 22,500 dollars by gift from two individuals, and its income from students has also since 1824 amounted to 10,000 dollars annually. The number of students in 1833 was 177, of whom 46 attended the scientific department, 76 the classical department, and 55 the English department. The college building is commodious: it possesses a good philosophical apparatus, and a library of 3000 volumes, besides several hundred volumes belonging to the students. The medical college, which was established in 1824, is empowered to confer medical degrees. The locality is a handsome building, for which the city council of Charleston appropriated 15,000 dollars, and the establishment has been further assisted by the states' legislature, which has granted to its funds the sum of 17,000 dollars.

Printing was introduced into South Carolina at Charleston in 1730, and the first newspaper was published in January, 1732; there were in 1834 three daily and three weekly papers published in the city. There are five banks established in Charleston with capitals amounting in the aggregate to 4,600,000 dollars; and two insurance companies, with capitals of 300,000 and 450,000 dollars respectively.

CHARLESTOWN, the principal town in Middlesex county, Massachusetts, is situated on a peninsula, formed by the river Mystic on the East, and Charles river on the West, by which latter it is separated from Boston, of which it may be said to form a suburb. The settlement at Charlestown somewhat preceded the founding of Boston. In the year 1628, Mr. Endicot, one of the patentees to whom King James the First had eight years before granted an extensive territory in America, went to New England, with about a hundred followers, and settled at the spot now called Salem. In the following year this small colony was joined by about two hundred other persons from England; but, in the course of the year, about 100 of the colonists removed, and with the consent of Mr. Endicot, settled themselves at Charlestown, then called by its Indian name of Mishawum.

In the early part of the American Revolutionary war Charlestown was destroyed by the English troops; previously to that time it was a thriving place, in which many branches of manufacture were carried on. It was speedily rebuilt, and became much more considerable than before the war. The population in 1830 amounted to 8787 souls. Besides the Charles-river bridge, by which the town is connected with Boston, there is a bridge across the river Mystic, which connects Charlestown with the town of Malden, in the same county. [Boston.]

CHARLEVILLE, a town in the department of Ardennes in France, in the immediate vicinity of Mézières, the capital of the department, and on the left bank of the Meuse, about 145 miles from Paris through Soissons, Reims, and Rethel. This town is of modern origin, having been built in 1609 by Charles de Gonzague, Duke of Nevers, afterwards Duke of Mantua. It is very regularly laid out, and the streets are very straight; there are four principal ones, into which the others run. The houses are of uniform height, covered with slate. There is a handsome square, surrounded by a piazza, and with a fountain in the middle. The town possesses a theatre, a considerable public library, and a museum of natural history and antiquities. Charleville was originally fortified, and had a citadel called Mont Olympe; but these fortifications were destroyed about 1687, by order of Louis XIV. of France, into whose hands the town had come. A stone bridge unites this town with the neighbouring town of Mézières.

The population of Charleville, in 1832, was 7400 for the town itself, or 7773 for the whole commune. The inhabitants manufacture iron wares, especially nails and fire-arms, of which last there is a government manufacture. Brass founding and the manufacture of soap are also carried on. There is a commodious port on the Meuse, and considerable business is transacted.

CHARLEVOIX, PIERRE FRANÇOIS XAVIER DE, born at St. Quentin in 1682, was educated by the Jesuits, and was admitted into their order in early life. In 1720 he was appointed to one of the Jesuit missions in Canada, and, embarking at Rochelle, he arrived at Quebec in the autumn of that year. He explored a large part of Canada, and examined several of the rivers and lakes, which were then not much visited by Europeans. In going from North America to St. Domingo, he suffered shipwreck; but a second voyage was more fortunate, and he reached that island in September, 1722. After two or three weeks' stay in St. Domingo, he sailed for France, and arrived at Hâvre in the month of December. He afterwards made a journey into Italy on some business of his order, which frequently entrusted him with important employments. Besides producing the voluminous works that bear his name, he wrote during twenty-two years in the 'Mémoires de Trevoux,' a literary journal conducted by the Jesuits. He died at La Flèche in 1761.

He was a laborious compiler, and the documents and accounts of foreign countries (furnished by Jesuit missionaries, who were scattered in almost every corner of the world) upon which he principally worked, were numerous and occasionally valuable; but both he and his authorities were partial, prejudiced, credulous, and superstitious, and too much given to tedious details of the proceedings and ceremonies of their own order. To this we must add that Charlevoix's style is somewhat heavy and diffuse. His separate works are, 1. 'History and Description of Japan,' which is taken almost entirely from Kämpfer; 2. 'History of St. Domingo,' which is derived from a MS. sent him by Father Le Pers, who lived twenty-five years in that island, and from some documents which existed in the bureaux of the French ministry of Marine; 3. 'History of New France,' which contains a good account of all the French establishments in Canada and North America, together with a tedious confused journal of his own travels in that part of the world; (the latter portion was translated into English in 1760, under the title of 'Journal of a Voyage to North America;') 4. 'History of Paraguay,' which was translated into English in 1769.

His thick quartos are a compound of travels and history, not very skilfully mixed; but although Charlevoix had neither the order and philosophy necessary to an historian, nor the enterprise and vivacity of a traveller, he was a very industrious man, and collected many things which still render his books valuable for occasional reference.

CHARLOCK, the vulgar name of Sinapis nigra and alba, common annual weeds which infest corn-land. They are so easily destroyed by a little care, that their presence can only be looked upon as evidence of slovenly agriculture.

CHARLOTTENBURG, a small town about a mile from Berlin, is built on the river Spree, and united to the capital by an excellent road, which is lighted by lamps. It contains a royal palace with a fine park, in which there is the sepulchral monument of Queen Luise, who died in 1810. There are also statues of the Great Elector and King Frederic I. Charlottenburg is a great place of resort for the people of Berlin, some of whom have fine country houses here. The population is about 6100. There are a few manufactures of cotton goods on a small scale.

CHARLOTTESVILLE, a post-town, and the county-town of the county of Albemarle, in the State of Virginia. on the bank of the Rivanna, a branch of the James river, It is situated in a beautiful and healthy country, about twenty miles from the Blue Ridge. Monticello, the former residence of Mr. Jefferson, is on the summit of a hill, about two miles from Charlottesville. Mr. Jefferson is buried in the grounds near the house. During the revolutionary war, Colonel Tarleton made an attempt, in which he nearly succeeded, to surprise the Virginia legislature, then sitting at Charlottesville. Mr. Jefferson, who was then governor of Virginia, narrowly escaped being taken in his own house.

The university of Virginia, which is about one mile from Charlottesville, was founded by the legislature of Virginia, under the superintendence of Mr. Jefferson, who was appointed the first rector and one of the visitors. The regulations for the government of this institution, and the general course of instruction, were formed by Mr. Jefferson. It is one of the few colleges in the United States which has not a clergyman for its president: no theological or religious instruction is given by the university.

The branches of instruction are the Greek, Latin, and Hebrew languages, the most important modern languages, mathematics, natural philosophy, moral philosophy and political economy, law, and chemistry. There is also a small medical school. The university possesses a well-

selected library of about 10,000 volumes, a philosophical and chemical apparatus, an anatomical and general museum, a cabinet of minerals, and an observatory.

CHAROLLES, a town in France, in the department of Saône and Loire. [SAÔNE et LOIRE.]

CHAROLLOIS, or CHAROLOIS, a district deriving its name from the above town, which was the capital of it. Charollois was a subdivision of the duchy of Bourgogne, and Philippe le Bon and Charles le Téméraire, the two last of the great feudal dukes, took, during their father's lifetime, their title from this district, being known as Counts of Charollois. It is included in the department of Saône et Loire, except a small part west of the Loire, which is for the most part comprehended in the department of Allier. [ALLIER, SAÔNE ET LOIRE.]

CHAROLLOIS, CANAL DU, otherwise called the CANAL DU CENTRE, one of the most important canals in France. It was commenced A.D. 1783 and finished A.D. 1792, and runs through the district from which it takes its name, connecting the navigation of the Loire at Digoin with that of the Saône at Châlons. From its junction with the Loire it follows the valley of the Arroux, a feeder of the Loire, for a very short distance, and then that of the Bourbince, a feeder of the Arroux. The only town of any importance near the canal, in this part of its course, is Paray (population, 2722, town; 3400, whole commune). The canal then passes through the étang or pool of Long Pendu, and follows the valley of the Dheune, a feeder of the Saône, to near the town of Chagny (population 2989), and then, turning off to the right, opens into the Saône at Châlons. Its whole length is given in the table subjoined to Malte Brun's *Géog. Universelle*, at 116,812 *mètres*, or about 72 English miles. It is the seventh of the French canals in respect of length. Its length, as measured on the maps of France by A. H. Brué, and by the Society for the Diffusion of Useful Knowledge, is, as near as can be, 70 miles.

CHARON, a native of Lampsacus, on the Hellespont, one of those numerous Greek historical writers now only known by their names and a few fragments. Charon lived before Herodotus, who was born B.C. 484, and he was younger than Hecatæus, who was probably in the vigour of his life about B.C. 500. Charon wrote a history of his native town, a history of Persia, a history of Crete, and other works. The loss of the Cretan history is to be regretted, as we possess so few materials for the antient state of that island. (See Suidas, Χάρων; Creuzer, *Historicorum Græcorum Antiquiss. Fragmenta, &c.* Heidelberg, 1806, 8vo.)

Suidas mentions two other writers of the name; one of Carthage, and the other of Naucratis, in Egypt.

CHARON, the fabulous boatman who conveyed the shades of the departed across the rivers which girt the infernal regions. (Eurip. *Alcest.* 253, 441; Aristoph. *Ran.* 202; Virgil. *Æneis*, v. 298.) His fare was an obol (the sixth part of a drachme), which was laid in the mouth of a person about to be buried, in order that he might have wherewith to pay the freight. (*ναῦλον, δανάκη.* Aristoph.; J. Pollux, ix. 82; and Juvenal, iii. 267.) Charon does not appear in Homer; his origin is referred to Ægypt (Diodor. i. 90), where he had a representative in Amenthes, the emblem of a future state: his name is thought to point to the joy produced by a freedom from sublunary troubles. (See Creuzer, *Symbolik*, i., p. 341.)

CHART, or SEA-CHART, a hydrographical map, or a projection of some part of the sea, in plano, for the use of navigation. Fournier, in his *Hydrographie*, (fol. par. 1667, p. 505,) ascribes the invention of charts to Henry, son of John, king of Portugal: certain it is that marine charts appear first to have issued from the Portuguese. Bagford says, the first step that was made toward a knowledge of our own coasts was by an almanac, with a chart of the coasting part of England, printed on vellum or parchment, by Wynken de Worde, 1520, and bound in a small portable volume. This was the first he had seen of the kind. (See Bagford's *Letter to Hearne*, prefixed to Leland's *Itinerary*, vol. i., p. lxxx., and *Spicileg. ad Gul. Neubrig.*, p. 749.) John Rotz, a native of Dieppe, and servant to King Henry VIII., made for the king's use a Book of Hydrography, so called, being an account of the compass, elevation of the pole, latitude, sea coasts, &c., 1542, finely painted on eighteen very large skins of parchment, still preserved among the royal manuscripts in the British Museum, marked 20 E., ix. Of this description also is a very curious chart, preserved in the same collection, formerly belonging to Lord Oxford, and probably of as early if not an earlier date than Rotz's charts. New Holland is laid down upon it as an island, under the name of Java le Grand. The writer of the present article, many years ago, consulted the late Captain Flinders for his opinion whether this portion of the chart could have been laid down from actual observation. The answer was, 'most certainly; for lines of red dots are made to border the coast exactly to the extent to which it is coral-bound, and no further; I was wrecked upon one of those reefs, and have reason to remember them.' The names of places are occasionally given upon the different shores in this chart, in French; and the very spot upon it which Captain Cook afterwards named Botany Bay is designated as *Côte des Herbages.*

The generality of the early Portuguese charts seem to have been made toward the close of the fifteenth century.

The particular species of charts most used at sea will be explained under the head MERCATOR'S PROJECTION. See also MAP, and STEREOGRAPHIC, ORTHOGRAPHIC, GNOMONIC, and CONICAL PROJECTIONS, under which last head look for Flamsteed's and the modern French projections.

CHARTA, MAGNA. [MAGNA CHARTA.]

CHARTE, from charta, 'paper,' was the name given to the letters of franchise granted by the kings of France during the middle ages to several towns and communities, by which they were put in possession of certain municipal rights or privileges, such as the free election of their local magistrates, &c. At present the word charte is used in France to signify the solemn acknowledgment made by Louis XVIII. on his restoration in 1814 of the rights of the nation, which is the fundamental law of the French constitutional monarchy, and the principle of which resembles that of the English constitution as founded on Magna Charta and the Bill of Rights. The legislative power is vested in two chambers, peers and deputies, subject to the king's sanction. All laws are promulgated by the king. The executive power is vested solely in the king, who appoints to all the offices of the administration, both civil and military, and has the command of all the military and naval forces. He also appoints the judicial officers, who however, when once appointed, cannot be removed by him. The king makes all treaties of peace, alliance, or commerce. His person is inviolable; but the ministers are responsible. One article of the Charte, having given occasion to a false interpretation, of which the ministers of Charles X. availed themselves to issue the famous ordonnances which gave rise to the revolution of July, was altered on the accession of Louis Philippe, and it was clearly explained that 'the king issues the necessary ordonnances and regulations for the execution of the laws, without having the power in any case to suspend the course of the law or to delay its execution.' The Charte, with this and one or two more modifications of minor importance, was sworn to by Louis Philippe on the 9th of August, 1830. Since that date, a change has been made by the legislature in the constitution of the Chamber of Peers. The Peers are for life, and the peerage is not hereditary in their families.

The Charte consists of sixty-nine articles, and is inserted in the 'Almanac Royal et National,' which is published every year. [LOUIS XVIII.]

CHARTER, or CHARTA. The primary meaning of Charta, or Carta, is paper, or any material to write upon, as charta pergamena (parchment). It then came to signify any deed or writing, in the same manner as liber (the inner bark of a tree), from which a sort of paper was made, now signifies any description of book.

The word Charter, though formerly used as synonymous with deeds and writings (Co. Litt., 6a), is now applied only to those grants of the king which create corporations, or confer some privilege or exemption; in fact, the word has acquired the secondary meaning of privilege or immunity.

Many charters, of great antiquity, are extant. The city of London possesses two granted by William the Conqueror in 1066, and several copies of Magna Charta and the Charta de Forestâ are in good preservation. Blackstone, quoting Matthew Paris, says, that an original great charter, under seal, was sent to every county in England, and to those which had forests within them a charter of the forest also; notwithstanding which, he continues, it is surprising how few of these originals are at present extant.

CHARTER-HOUSE, London. Sir Walter de Manny, knight, a stranger born, lord of the town of Manny, in the diocese of Cambray, in the Netherlands, who for services

rendered to King Edward III. was made one of the first knights of the order of the garter, in the year of the great plague, 1349, bought a piece of ground without the bar of West Smithfield, which he inclosed and had consecrated for the burial of the dead, and where, in that year alone, more than 50,000 bodies are said to have been interred. It was thereupon called the New Church-Hawe, and a chapel was built, wherein, about the year 1360, Sir Walter de Manny intended to found a college for a warden or dean, and twelve secular priests; but in the next year that design was altered, when Michael de Northburgh, bishop of London, joined with him in the building and endowing a priory in this place for double the number of Carthusian monks, which was to be called 'The Salutation of the Mother of God,' and the foundation appears to have been finished about A.D. 1370. The gross revenue of this house at its surrender to King Henry VIII., June 10, 1535, amounted to 736*l.* 2*s.* 7*d.*, its clear income to 642*l.* 0*s.* 4½*d.* per annum. Bearcroft, in his 'Historical Account,' says the site of this house was first granted June 12, 1542, to John Bridges and Thomas Hale, for their joint lives; and April 14, 1555, to Sir Edward North, who was made a baron 1st Mariæ: his son, Roger Lord North, sold it May 31, 1565, to the duke of Norfolk, for 2500*l.*, whose son, Thomas Howard, earl of Suffolk, sold it in the 9th Jac. I. to Thomas Sutton, Esq., for 13,000*l.*, who founded upon it, and largely endowed, a most magnificent hospital, consisting of a master, preacher, a head schoolmaster, and second master, with forty-four boys and eighty decayed gentlemen, who have been soldiers or merchants, besides a physician, chirurgeons, register, and other officers and servants of the house. Beside the scholars upon the foundation, whose number is now limited to forty-two, the masters are allowed to receive certain others, whose number fluctuates from one to two hundred. The Charter-House is considered one of the first schools of the metropolis. Among the eminent persons who have received their education there, may be enumerated Dr. Isaac Barrow, the mathematician; Addison; Steele; Dr. Benson, bishop of Gloucester; Sir William Blackstone; the late earl of Liverpool; and the late Rev. Dr. Charles Burney.

The Charter-House, no doubt, derives its name from a corruption of *chartreux*, a monastery of Carthusians. The persecution of certain monks of this hous forms a striking feature in the history of the Reformation of the time of Hen. VIII.

(See Dugdale's *Monasticon*, new edit., vol. vi., p. 6. Tanner's *Notit. Monast.*, edit. Nasmith, *Midd.* viii., 3. Bearcroft's *Hist. Account of Thomas Sutton, Esq.*, 8vo., Lond., 1737. Carlisle's *Descr. of the Endowed Grammar Schools in Engl. and Wales*, 8vo., Lond., 1818, vol. ii., p. 2.)

CHARTRAIN, a district in France, bounded on the N.E. by the Isle de France, on the N.W. by Perche, on the S. by the Orléanois and Dunois. It formed part of the more extensive district of Beausse. [BEAUSSE.] It takes its name immediately from its capital, Chartres, but originally from the people, Carnutes, by whom, at the time of the Roman invasion, it was peopled. This nation is mentioned by Livy as one of those which, in the time of Tarquin the elder, king of Rome, contributed their contingent to the force which crossed the Alps and inundated the north of Italy. [CELTÆ.] In the time of Cæsar they extended from the Seine to the country south of the Loire. It was in the territory of this people (which Cæsar informs us was held to be the central region of Gaul), that the Druids held their great annual convention. It is not very easy to judge of the relative political and military importance of this nation: they appear to have been under the protection of the Remi ('quorum erant in clientela' is Cæsar's expression, *De Bel. Gal.*, vi. 4), and their part in the struggle against the Romans is not such as to indicate pre-eminent power or valour. They slew Tasgetius, whom Cæsar had appointed to be their chief, and allied themselves with their neighbours, the Senones, to oppose the Romans; but the vigour and activity of Cæsar, who, in his sixth campaign, B.C. 53, took the field before the usual period of the year, led them to submit without striking a blow. In the following year they were active in forming a general confederacy of the Gauls against the Romans, and offered to take the lead in the revolt. On the appointed day, therefore, under the command of Cotuatus and Conetodunus, they assembled at one of their towns, Genabum (now Orléans), and murdered all the Roman traders whom they found there. So rapidly was the news of this stroke spread, that 'what was done at Genabum at sunrise was known before the conclusion of the first watch (i.e. before 9 p. m.), in the territories of the Arverni (Auvergne), which is 160 (Roman) miles off.' Their quota of the force destined to raise the siege of Alesia was 12,000, and they probably shared in the defeat consequent on that attempt. Towards the close of that summer, or early in the following winter, between the seventh and eighth years of Cæsar's command, they attacked the Bituriges, who had submitted to Cæsar; but Cæsar, hastily leaving his winter-quarters with a part of his troops, advanced into their country and compelled them to disperse, and left part of his army to pass the rest of the winter in quarters at Genabum. In the course of the following summer they were finally reduced by Cæsar's lieutenant, Fabius. (Cæsar, *de Bel. Gal.*, lib. v.,vi., vii., viii.)

CHARTRES, a city in France, in the department of Eure et Loir, of which it is the capital. It stands on the river Eure, a feeder of the Seine, 46 miles in a straight line S.W. by W. of Paris, or 52 miles by the road through Versailles, Rambouillet, and Epernon; in 48° 26′ N. lat., and 1° 28′ E. long.

Chartres is a very antient city. Under the Roman dominion it bore the name of Autricum, but in the fourth century this name was replaced by that of the people, the Carnutes [CHARTRAIN], whose capital it was. It does not appear to retain any relics of Roman antiquity, save the remains of some subterranean aqueducts for conveying to the town the water of some springs about four or five miles south of it, and some subterranean passages leading from the town, and extending about seven miles to the W. and W.N.W.

In the civil dissensions of the Merovingian kings, and in the ravages of the Northmen, Chartres suffered. In 858 it was pillaged and burnt by the Northmen, taken again by them under their famous leader Hastings, but given up by him on the townsmen and the bishop agreeing to pay a certain sum as a ransom. Their neglect to pay this tribute caused another siege and capture of the town. In 911 the townsmen successfully resisted the attacks of the famous Rollo, the first duke of Normandie.

In the middle ages, Chartres was the capital of a county, which was, in the tenth century, united with that of Blois and Tours. At a later date, the town was troubled by quarrels between the clergy and the townspeople or the nobility; those between the count of Chartres and the chapter of the cathedral were made up by express agreement in 1294; but they were succeeded by long disputes between the bishop and the chapter, carried on by interdicts and excommunications, the usual weapons of ecclesiastical warfare. The county of Chartres had come by purchase into the hands of the King Philippe IV. le Bel, and had been bestowed by him on his brother Charles of Valois. Upon the accession of Philippe of Valois, son of Charles, to the crown, it was reunited to the royal domains, and continued so till it was given as dowry to the daughter of Louis XII. when married to the duke of Ferrara. During this interval it was disputed by the Bourguignon and Armagnac factions, passed under the dominion of the English, and was taken from them by surprise by Dunois, bastard of Orléans, and others. The bishop, a zealous partizan of the Bourguignon and English party, was killed in the struggle on this last occasion. In the religious wars of the sixteenth century, the town was taken and retaken by the different parties; and it was here that Henry IV. was consecrated after mastering the place by force of arms. The county of Chartres, when bestowed on the duchess of Ferrara, was erected into a duchy: it subsequently came by marriage to the dukes of Nemours, by whom it was resigned to the crown. Louis XIII. bestowed it upon his brother Gaston, duke of Orléans: upon his death, Louis XIV. gave it to his own brother Philippe, duke of Orléans, from whom the duchy was inherited up to the period of the Revolution by his lineal descendants, the present royal family of France. The eldest son of the present king, Louis Philippe, bore the title of duke of Chartres up to the time of his father's accession.

The city of Chartres is situated on the brow of a hill, at the foot of which is the river Eure, which flows here in two channels, one within and the other without the antient ramparts, which yet remain, and are surrounded by a circuit of public walks. Chartres is divided into the upper and lower towns; the upper has some tolerably commodious streets, and contains the principal public edifices: the lower town is ill built and ill laid out; the streets which unite the

two are so steep as to be almost inaccessible to carriages. Every thing about the place has an air of antiquity: the houses are for the most part old; many of them still have the door-way in the form of a pointed arch, with Gothic ornaments. The suburb of Bourgneuf, by which the road from Paris enters the town, is long and straggling, presenting for the most part the appearance of a mere village consisting of cottages with their gables towards the street. There are in Chartres four squares; one in the lower town, that of St. Pierre, bordered with two rows of trees, and adjacent to the antient Gothic church, from which it takes its name; two in the upper town, viz., the corn-market and the herb-market; and one, the handsomest of all, called La Place des Barricades, outside the walls. The herb-market is adorned by an obelisk, erected by the inhabitants (A.D. 1801) to the memory of their fellow townsman, General Marceau.

But the finest edifice in Chartres is the Cathedral. The first cathedral had been burnt by the Normans, A.D. 858, but it was repaired: in the 10th century it was again burnt: and a third fire, in 1020, occasioned, according to general belief, by lightning, consumed not only the Cathedral, but nearly the whole city. By the zeal of the then bishop, Fulbert, liberal contributions were obtained towards the rebuilding, and the work was commenced; the building however proceeded slowly, and it was not until 1260 that it was dedicated. Even at that period only one of the great towers was surmounted by a spire, the second spire not having been added till the 16th century.

The principal front is one hundred and fifty French feet in breadth, and is formed by two square towers and the interval between them, the towers and the intervening part of the structure being each fifty feet in breadth. The spires which surmount the towers are of different architecture and of different heights. The old spire is a pyramid of many sides, rising to the height of three hundred and forty-two French feet from the ground: the architecture is plain and heavy: but it is cased with stone curiously carved like the scales of a fish: it always appears to be leaning towards the spectator wherever he may be standing. The new spire is 378 French feet high: it is of much more florid architecture than the other, and is so much admired as to have become proverbial for its beauty. That part of the front which is between the towers has a portal with three doorways, with pointed arches, and is adorned with statues, which were preserved at the destruction of the former cathedral, and are interesting as memorials of the state of the arts in the dark ages. Above the doorways are three arched windows with stained glass, and still higher a superb circular window, or rose. The north and south sides of the church are of equal interest with the principal front. The transepts have each a handsome portal of three doorways, built out from the church; over these are windows, and over the windows a large rose.

The interior of the church is admirable for the justness of its proportions; it has a peculiarly sombre character, which arises from the windows being so charged with colour as to exclude more light than usual. It is only in very clear weather that there is light enough to read. The choir is beautiful: it is adorned with statues and bas-reliefs of various merit: the Descent from the Cross, a bas-relief by Bridan, is a chef-d'œuvre: and the Presentation of our Saviour in the Temple, by the same sculptor, is much admired. There is a noble group behind the high altar, of the Assumption of the Virgin, also by Bridan. A curious anecdote is connected with this piece. During the revolutionary troubles, the barbarians who were predominant proposed to destroy it, and were proceeding to execute their purpose, when one of those present, anxious for its preservation, proposed to crown the figure of the Virgin with the *bonnet-rouge*, and thus transform her into a goddess of liberty. The offer was accepted, and the sculpture was thus preserved. The inner dimensions of the cathedral are as follows:—length, three hundred and ninety-six feet; breadth at the transept, one hundred and ninety-five feet; height to the point of the vaulted roof, one hundred and six feet. The above dimensions are in French feet, which exceed the English feet in the proportion of 16 to 15. Under the cathedral is a subterranean church, with several chapels, one of which, the chapel of the Virgin, was formerly much resorted to by pilgrims.

Chartres had formerly seven parish churches. That of St. André (St. Andrew), which was collegiate, stood on the bank of the Eure, and having to be enlarged, a bold arch was thrown over the river, and upon this arch the choir was built. The choir has since been destroyed, and the rest of the church, used as a store-house, is falling to ruin. The church of St. Pierre (St. Peter) has some fine painted windows: this was once the church of a Benedictine abbey, now converted into a barrack. There were formerly several religious houses. The office of the Prefect is a new building, with pleasant gardens round it: and there is a handsome modern theatre.

The population of Chartres, in 1832, was 13,576 for the town, or 14,439 for the whole commune. The chief trade of the place is in corn and flour; the corn-market is the first in France. Some serges and other woollen goods are manufactured, and some hosiery; a good quantity of leather is made, and there are several dye-houses. There is a museum of natural history, and a public library of 30,000 volumes and 700 manuscripts. A noble hospital or almshouse has been lately founded by M. d'Aligre, who has devoted to its erection and endowment a sum of more than 80,000*l.* It is intended for 100 infirm persons, of each sex, and 100 foundling children.

The arrondissement of Chartres contained in 1832 a population of 103,783. (Dulaure, *Hist. des Environs de Paris;* Vaysse de Villiers; Malte-Brun.)

CHARTREUSE, a celebrated monastery of the Carthusians (*les Chartreux*) [CARTHUSIANS], the first established of that order, and therefore distinguished by the epithet *La grande Chartreuse*. It is in the department of Isère, in France, and amidst the sublime scenery of the Alps. Travellers who wish to visit it usually go from Grenoble on account of the better accommodation for the journey to be procured there, although the post town of les Echelles in Savoy is considerably nearer. However, in going from Grenoble, travellers frequently make a circuit which brings them into the road from les Echelles at the village of St. Laurent du Pont, the approach in that direction being more picturesque. From St. Laurent the road runs along the bank of a mountain-torrent, the Guier, through a narrow pass, which is closed by a house with an arched gateway under it and a double door. This doorway is the entrance to the inclosure of the Chartreuse, which is formed by a group of mountains, the loftiest, steepest, and wildest in the neighbourhood, covered from their base to their summit by a dark pine-forest. In this inclosure the road runs through a thick pine-forest, a lofty mountain rising precipitously on the right, and on the left is the abyss through which the Guier flows. After a while the valley widens, the forest is no longer so dense as to exclude the light, and the beech replaces the pine, which is seen only on the summit of the rocks; at length the forest ceases, and the traveller emerges into a large meadow, at the farther end of which the monastery appears in all its extent.

The other approach, and the more direct from Grenoble, is by a mountain, Le Sapey, from the summit of which is a fine view of Grenoble and the valley of Grésivaudan, in which it is situated. The road from Le Sapey to the inclosure of the Chartreuse lies through pine-forests with some intervals of pasture: there are even some farm-houses and a small hamlet. The inclosure of the Chartreuse is entered on this side by a narrow pass and by a house with a gateway under it, similar to that already described: and at a short distance from this entrance is the village of Chartreuse, from which the monastery derives its name.

This awful solitude was the cradle of the Carthusian order. [BRUNO.] Bruno himself did not give any rules of his own to his followers; to reduce the Carthusian discipline to a system was the work of a remote successor. The cell of St. Bruno is now converted into a chapel, and the fountain is still shown at which he quenched his thirst.

This monastery has been burned eight times; twice by the Calvinists in the religious wars of the sixteenth century.

Our authorities do not state when the present building was erected; it is a substantial edifice of simple architecture, but magnificent by its extent and situation. The buildings inclose a large oblong square or cloister, 714 English feet in length: the cells of the fathers, eighty in number, are around this cloister, with mottoes from scripture or some religious book painted outside the doors; each cell includes two rooms, besides a closet for books, and a wood-room on the ground floor, opening into a little inclosed garden. The hall is adorned with portraits of all the generals of the order; the table of the kitchen is formed of two course

marble slabs of enormous size; there are extensive cellars, and a place where cheese is made similar to that of Gruyères.

Before the French Revolution, the monks had considerable property in the woods around the monastery, but at the Revolution they lost this as well as the monastery itself. The woods were sold, but the building, not being suited for any purpose, found no purchaser. Upon the return of the Bourbons, the monks came back and recovered the monastery, with the meadows around it, and the right of gathering fuel in the woods. In 1830 there were about 150 persons, monks and lay brethren, in the monastery: they visit the sick, and perform spiritual duties in the small churches or chapels scattered over the surrounding mountains. (Vaysse de Villiers; Expilly; *Penny Magazine*.)

CHASE, that part of a gun which is between the ring near the trunnions, and the astragal mouldings near the muzzle.

CHASMO'DIA, a genus of coleopterous insects of the section *Lamellicornes* (*Scarabæus*, Lin.), and sub-section *Xylophili* (Latreille). Technical characters:—Body rather convex and broad: scutellum large, somewhat triangular, equalling in length at least one third of that of the elytra: the mesosternum is prolonged into a blunt point, and extends as far as the base of the femora of the anterior pair of legs: the mandibles are entire, and obtuse at the apex: maxillæ with only two teeth, and furnished with a tuft of fine hairs at the extremity; mentum elongated: elytra shorter than the abdomen, broad behind and obtusely rounded. The male Chasmodia has the upper claw of the fore tarsi very broad and bifid, or divided at the apex: the inner claw is small and entire; the claws of the four posterior legs are entire and of large size. The female has all the claws of small size; those of the anterior pair of legs simple; the four posterior legs have the outer claw bifid*. The tarsi of the male are thicker than in the female, particularly those of the anterior pair of legs.

All the species of this genus are of large size, and may be readily distinguished from the Cetoniæ by their large scutellum and convex form, combined with their smooth and glossy appearance. The thorax is convex, and has the posterior margin considerably waved; the part joining the scutellum has a segment of a circle as it were cut out to admit the fore part of the latter, which is rounded: this character is also observed in the genus Cetonia and Macraspis, and affords a good point of distinction between these and the groups nearest allied. The genus Macraspis has also a very large scutellum, but differs in the tarsi and other parts, which will be described under the proper head.

Chasmodia viridis is about an inch in length and of a deep blue-green colour throughout, with the exception of the antennæ, the basal joints of which are pitchy red, and the club is black.

There are four other species known, some of which are of a glossy brown or chestnut colour; they all inhabit South America: the species above named is common in collections from the Brazils. [MACRASPIS.]

CHASTELLET, GABRIELLE-E'MILIE LE TONNELIER DE BRETEUIL, MARQUISE DU, the translator of Newton into French, was the daughter of Baron de Breteuil, and was born in 1706. In what manner she was led to study mathematics is not stated; she also became a proficient in Latin, English (in which Voltaire, as he tells us, was her instructor), and Italian. She was married very early to the Marquis du Chastellet, and died August 10, 1749, her death having been hastened by close application to her translation of Newton. She died in the palace of Luneville, at the court of Stanislas, where Voltaire also was then residing. Her *liaison* (as the French call it) with Voltaire furnished sundry anecdotes for the scandalous chronicles of her day. The state of manners however, and in particular the method in which marriage was contracted among the French, are too well known to require any comment.

In 1738 Madame du Chastellet wrote, for the prize of the Academy of Sciences, on the nature of fire. In 1740 she published at Paris her 'Institutions de Physique,' addressed to her son, and a second edition appeared at Amsterdam in 1742. This work is a series of letters, in which the systems of Leibnitz and of Newton (the latter then almost new in France) are explained in a familiar style, and with a degree of knowledge of the history of the several opinions, and of sound language and ideas in their discussion, which we read with surprise, remembering that they were the production of a Frenchwoman thirty years of age, written very few years after the introduction of the Newtonian philosophy into France. She takes that intermediate view between the refusal to admit the hypothesis of attraction, and the assertion of it as a primary quality of matter, from which very few who consider the subject would now dissent. At the end of this work is an epistolary discussion with M. de Mairan, on the principle of *vis viva*, the metaphysical part of which then created much controversy.

The translation of Newton was published at Paris in 1759, with a 'préface historique,' and an *éloge* in verse by Voltaire, who probably owed to Madame du Chastellet the smattering of knowledge upon which he wrote his 'Elémens de la Philosophie de Newton,' published in 1738. From it we learn that the translation was submitted to the revision of Clairaut, who was the instructor of the authoress in mathematics. To the work is added a commentary, which bears the name of Clairaut, being in fact his lessons committed to writing and arranged by Madame du Chastellet, and afterwards revised by their author. We here find, 1. a popular account of Newton's system; 2. investigations of various points by the analysis of the continental school, to the exclusion of the geometry of Newton; 3. an abridgment of Clairaut's work on the figure of the earth; 4. another of Daniel Bernoulli's essay on the tides. The translation itself is a close copy of the original in form and matter, but does not profess to be perfectly literal, where the Latin is concise or obscure. It was used by Delambre in his citations (*Hist. d'Astron.*, xviii. siècle), expressly that he might have the sanction of Clairaut in his versions of Newton. In 1806 the correspondence of Madame du Chastellet with the Count d'Argental was published at Paris, to which was appended a life, and a treatise 'Sur le Bonheur.' (*Biog. Univ.*; *Mémoires pour servir à la Vie de Voltaire, écrits par lui-même*; *la Vie de Voltaire, par* Condorcet.)

CHATEAUBRIAND. [LOIRE INFERIEURE.]

CHATEAU CHINON. [NIEVRE.]

CHATEAUDUN, a town in France, in the department of Eure et Loir, on the banks of the river Loir (which uniting with the Sarthe flows into the Loire), and on the road from Paris to Tours. It is 68 miles in a straight line S.W. of Paris, or 81 miles by the road through Rambouillet and Chartres, and 29 miles S. by W. from the latter town, which is the capital of the department: 48° 5′ N. lat., and 1° 18′ E. long.

This town was formerly the capital of the Dunois, a district included in the general government of Orléans, and in the diocese of Chartres. It is a town of considerable antiquity, being mentioned by Aimoin and Grégoire of Tours. In the tenth century it appears to have been subject to Thibaut le Tricheur, Count of Blois, Tours and Chartres, who built here an old tower, part of the castle, which is still standing. Afterwards Châteaudun had viscounts of its own until the fifteenth century, when it was united with the county of Dunois. The counts of Dunois built the rest of the castle.

Châteaudun was burnt in 1723, and rebuilt on a regular plan, which renders it one of the handsomest towns in France. The streets are broad and straight, with neat and uniformly built houses, and some good public buildings, such as the town-hall, the office of the sub-prefect, formerly a convent, and the college or high school. The castle is a Gothic building, and one of the finest of the kind in France. The walls of the old tower, built by Thibaut, are about 16 feet thick. There is a good *place*, or square, and a handsome public walk.

The inhabitants, in 1832, amounted to 6461. They do not seem to be engaged to any great extent in trade or manufactures except that of blankets. There is a public library.

Châteaudun was erected into the capital of a bishopric in the sixth century, by one of the Frankish Merovingian princes; but the act having been irregular, the pretended bishop could not maintain his station. It is now the capital of an arrondissement, which had, in 1832, 59,758 inhabitants.

CHATEAU GONTHIER, a town in France, in the department of Mayenne, on the right bank of the Mayenne, and on the road from Laval to Angers. It is about 154 miles W.S.W. of Paris, in 47° 50′ N. lat., and 0° 41′ W. long.

This town was built by Foulques, or Fulk Nerra, count of

* [illegible] been more than usually minute in these characters, because in [illegible] to they are wrongly described. In the 'Règne Animal' [illegible] as being entire.

Anjou, about A.D. 1037. It would be a handsome town if its streets were not so crooked. The houses have a cheerful aspect, and several of them are handsome.

There is a pleasant promenade commanding a delightful prospect of the country through which the Mayenne flows; the banks of the river are adorned with pleasant meadows, orchards, and walnut-trees, and crowned with steep slopes. One of the principal suburbs is separated from the town itself by the river.

The inhabitants amounted, in 1832, to 6143. The chief branches of trade are in linen cloth, of superior quality, which is made and bleached here, and in wax: serges, and other woollens, hats, and leather, are also made, and the town serves as an emporium for the wine, coal and slate of Anjou. There is a good High School, and three hospitals, or almshouses. The arrondissement of Château Gonthier had, in 1832, a population of 72,888: it is the chief grain district of the department.

CHATEAULIN. [FINISTERRE.]

CHATEAUROUX, a town in France, capital of the department of Indre, on the river Indre, and on the road from Paris by Orléans to Limoges, 144 miles S. by W. from Paris, in a direct line, or 157 miles by the road; in 46° 48′ N. lat., and 1° 40′ E. longitude.

The town takes its name from a Frankish noble, Raoul de Déols, who built both the town and castle: Châteauroux is therefore a corruption of Château Raoul. Its feudal history has neither importance nor interest. The town is situated in an extensive plain, in which a great number of cattle are fed. The castle stands at one end of the town, on a hill, and notwithstanding its great antiquity, still serves as the office of the prefect. Mr. J. Cobbett describes the town as 'a confined and dirty assemblage of streets and houses, on a rapid declivity, under which runs the Indre.' There is an antient church in the lower town almost destroyed, and a prison, consisting of two towers and an archway, formerly, no doubt, one of the gates of the town, though from the continued increase of the place it is now nearly in the middle of the town. (*Letters from France.*)

The population, in 1832, was 10,851 for the town, or 11,587 for the whole commune. The principal manufacture carried on is that of woollen cloth. There is a library, a Society of Agriculture, Commerce, and the Arts, a college or high school, and a theatre. The population of the arrondissement, in 1832, was 90,545.

CHATEAU THIERRY, a town in France, in the department of Aisne, on the bank of the river Marne, and on the road from Paris to Bar, Nancy, and Strasbourg. It is 47 miles E. by N. of Paris in a straight line, or 56 miles by the road: 49° 2′ N. lat., and 3° 21′ E. longitude.

The town derives its name from a castle built about A.D. 720, by Charles Martel, as a residence for Thierry IV., a child whom he had made nominal king. Round this castle a town was gradually formed, which became at a later period the residence of the counts of Champagne.

Château Thierry rises in the form of an amphitheatre on the right bank of the river. It is well built, and is overlooked by the ruins of an antient castle. The population, in 1832, was 3749 for the town, or 4697 for the whole commune. The chief articles of manufacture are linens, cottons, earthenware, and leather. Considerable trade is carried on in corn, wool, cattle, wine, gypsum, and mill-stones.

This town suffered severely in the invasion of France by the allies, in 1814: the town and suburbs were three times pillaged. It is the native place of La Fontaine, whose statue has been erected upon the bridge over the Marne. Château Thierry is the capital of an arrondissement, which had, in 1832, 60,771 inhabitants.

CHATELET, or CHASTELET, properly a little fortress. This name was afterwards given to certain courts of justice, formerly established in several cities of France, as at Orléans, Montpellier, &c. The Grand Châtelet, at Paris, was the place where the presidial and ordinary court of justice of the provost of Paris was held. It consisted of a presidial, a civil chamber, and a chamber of policy. The Little Châtelet, at Paris, answered to its proper name; it was an antient fort, serving as a prison. (See Furetière, *Diction. Universel, in voce.*)

CHATELLERAULT, a town in France, in the department of Vienne, on the river Vienne, and on the high road from Paris to Bordeaux. It is 164 miles S.W. by S. from Paris in a straight line, or 190 miles by the road: in 46° 50′ N. lat., 0° 32′ E. long.

This town owes its origin and name to Hérault, lord of the soil in the eleventh century, who built here a castle, Château d'Hérault, which is no longer in existence. The town stands on the right or east bank of the Vienne, which separates it from one of its faubourgs or suburbs. This suburb is united to the town by a fine stone bridge, built by the celebrated duke of Sully, the approach to which on the town side is by an avenue forming a public walk, and by a gateway passing through a castle with four towers, also built by Sully. Some have confounded this with the old Château d'Hérault, which, as observed above, has been demolished. The town itself is ill built, but has been improved during the present century by several new houses, the result of the increasing trade of the town.

The inhabitants amounted, in 1832, to 9437. They were formerly engaged in the manufacture of clocks and watches and cutlery. The manufacture of clocks and watches is not, however, mentioned by the more modern of our authorities; that of cutlery still continues to be the staple article of the town. Five hundred families are said to be engaged in this branch of industry, but they are supported rather than enriched by it. Their knives are particularly in repute; they are cheaply and nicely got up, but their temper wants hardness: they are stamped by appointed officers, who are particular in rejecting such as are not properly finished. The sale of these articles to passengers through the town is considerable, and M. Millin (*Voyage dans les Départements du Midi*, Paris, 1811,) gives the following account of the eagerness with which the dealers press the sale of their articles. 'As soon as the traveller reaches Châtellerault, he is assailed by a swarm of women, whose object is to urge by every means the sale of their knives. However he may entrench himself in his carriage, there is no means of escape; they immediately hang on the doors or clamber up the naves and spokes of the wheels, or get upon chairs: the mind anticipates with alarm the accidents which might happen if the horses were to start; and the traveller, apprehensive of causing some disaster, opens the window, and is immediately beset with more urgent entreaties. Harassed and worried, he at last makes a purchase; and then the roguish postilion, who was in league with these clamorous petitioners, whips on his horses; but up to the purchase he always finds something to do, or some part of his harness that wants to be adjusted.' The manufacture of serges and other woollen stuffs, *sabots* or wooden shoes, leather, and lace, is carried on; and there are three places for bleaching wax. To the above articles of trade may be added wine, grain, wool, hemp, fruits, wax, honey, nut oil, and other agricultural produce, and millstones. The trade of the place is much favoured by its situation on the river Vienne, the navigation of which commences about seven miles above the town, and on which there is a good port. During the last war, when the maritime superiority of England interrupted the coasting trade of France, Châtellerault became the centre of considerable internal trade. The wines and brandies of the south were brought hither by land, and transmitted to the north of France by the Vienne, the Loire, the Canal d'Orléans, and the Seine; while the linens and woollens of the north, arriving at Châtellerault by water-carriage, were dispatched by land to Bordeaux.

Châtellerault is the capital of an arrondissement, which contained, in 1832, 50,413 inhabitants. It contains a high school, an agricultural society, and a theatre. It was the native place of Jean Daillé, a celebrated Protestant minister and writer. The Scotch duke of Hamilton bears the title of duke of Châtellerault, which was bestowed on one of his ancestors in 1548.

CHATHAM, a market-town and parliamentary borough on the Medway, in the lathe of Aylesford, Kent. The town (including Brompton, which is a village connected with the dock-yard and naval and military establishments, at a little distance from what is strictly the town of Chatham) is in the two parishes of Chatham and Gillingham, and joins Rochester on the east. Its distance from London by the Dover road, which varies but little from the direct distance, is about thirty miles E. by S. By the Reform Act, Chatham was created a parliamentary borough, with a boundary extending considerably on the S. and E. sides of the town, and it now returns one member. The population within the boundary was estimated at 19,000; the returns of 1831 give 16,485 as the population of the town.

From various discoveries made in erecting the fortifica-

tions which inclose the naval and military establishments at Chatham, it seems probable that the Romans had a burying ground here. A number of antient graves and other excavations were opened, and Roman bricks, tiles, coins, and weapons were found. The name of the town is Saxon, and was written Cetcham or Caettham, which is supposed to signify 'the village of cottages.' It continued an insignificant place until the formation of the dock-yard, since which time the town has sprung up. The parish of Chatham is very extensive; a small part of it is within the liberties of the city of Rochester. The parish church was almost entirely rebuilt in 1788; in addition to it there is a church, erected in 1821 by the commissioners for building new churches, the patronage of which is held by the incumbent. The parish is in the diocese of Rochester.

The extensive naval and military establishments are at Brompton, a little distance from the town, and entirely separated from it by a line of fortifications. The dock-yard was founded by Queen Elizabeth, previous to the invasion of the Armada, on the site of what is now termed the Ordnance Wharf, and occasionally the Old Dock. It was removed to its present situation in 1622, the demands of the navy requiring increased accommodation. Elizabeth erected Upnor Castle, on the opposite side of the Medway, for the purpose of defending the dock-yard and shipping. But this fort proved ineffectual for protection from the attempt of the Dutch, under De Ruyter, who, in 1667, having taken Sheerness, dispatched his vice-admiral, Van Ghent, with seventeen sail of light ships, and eight fire ships, to destroy Chatham. He succeeded in breaking a chain stretched across the Medway, and, in spite of the fire from the castle, burnt and sunk some ships. Finding the country alarmed, he retired, carrying off a ship of war named the Royal Charles. It appears from Pepys's *Diary*, that this attempt of the Dutch created great alarm, and that the greatest confusion and imbecility prevailed at this time in the English councils. After the affair was over, the various parties connected with the admiralty strove, with characteristic meanness, to shift the blame on others. This event was the cause of stronger and additional fortifications being erected.

In the reign of Queen Anne two acts of parliament were passed for the extension of the dock-yards and arsenals of Chatham, Portsmouth, &c. But nothing very important was effected at Chatham until after 1757, when, from that period down to 1805, according as alarm respecting French invasion prevailed, or as the rapidly increasing navy required, new buildings were erected, and the extensive area occupied by the different establishments was inclosed by a strong line of fortifications on the land side, and protected on the river side by strengthening Upnor Castle, by the erection of a martello tower called Gillingham Fort on the Chatham side, and other defences. Upnor Castle is at present merely a powder magazine.

The naval and military establishments consist of a dockyard, nearly a mile in length, which has four wet docks capable of receiving vessels of the largest class; an extensive arsenal; barracks on a large scale for artillery and engineers, infantry and royal marines; a park of artillery; magazines and store-houses; besides a handsome dock-chapel, and a number of habitations for the civilians who are employed. The principal mast-house is 240 feet long by 120 wide. The rope-house is 1128 feet in length, and 47½ wide, in which cables 101 fathoms in length and 25 inches in circumference are made. The machinery used in all the departments is of the very best kind. A duplicate of Brunel's block-making machine is kept here, ready for use in case the machine at Portsmouth should get out of order. The engineer barracks are built in a plain and simple style, and are extensive and convenient. There is a school for engineers, which was established in 1812, in which young officers and recruits of the engineer service are trained to a practical knowledge of their duties. Near the dock-yard gate is a large naval hospital, which was erected at the suggestion of the present king (William IV.) when lord high admiral.

At Rochester Bridge, the Medway, which discharges into the same æstuary with the Thames, is a large tide river. The rise is eighteen feet at spring and twelve at neap tides at Chatham. Above Rochester the high lands approach each bank of the river, forming a kind of amphitheatre about Chatham and Rochester on the east side, and also on the west, closing on the river at Upnor Castle. Below Chatham dock-yards the high lands decline, first on the right, and then on the left bank forming a flat, marshy country, to the spacious outlet of the Medway at Sheerness.

There is an establishment for convicts at Chatham, consisting of four ships, one being appropriated for juvenile offenders, and another used as an hospital. The prisoners are employed in different departments of the dock yard and arsenal.

The 'Chest' at Chatham was established in the reign of Elizabeth, and was originally a voluntary contribution from the monthly wages of seamen for the support of their maimed and superannuated brethren, but which soon settled into a compulsory payment. Several notices occur in Pepys's *Diary* of complaints of maladministration of this charity. On the recommendation of the Commissioners of Naval Inquiry, it was, by the 43 G. III. c. 1[illegible] removed to Greenwich. The monthly payment from the wages of seamen is now abolished by the 4 W. IV. c. 34, and the amount is charged annually on the consolidated fund.

An hospital for lepers was established at Chatham by bishop Gundulph, in the reign of William the Conqueror. It appears to have been incorporated. Its revenues, which were small, escaped confiscation at the time of the dissolution of the monasteries, though attempts were afterwards made in the reigns of Elizabeth and James I. to wrest them from the hospital. The building does not now exist, with the exception of a small chapel, but the revenues of the estate are in the hands of the dean of Rochester. On the north side of the High-street, or principal street of Chatham, there is an hospital for decayed mariners and shipwrights, which was founded by Sir John Hawkins in 1592, and incorporated by Elizabeth in 1594. It is a neat and convenient building: the funds support ten pensioners. There are several minor charities.

The Education Returns of 1835 give nine daily schools, and ten sunday schools as then existing at Chatham.

(Hasted's *Kent*; Douglas's *Nenia Britannica*; Pepys's *Diary*; Dupin's *Military and Naval Power of Great Britain*; *Boundary Report*; *Population Returns.*)

CHATHAM, EARL OF. [PITT.]

CHATILLON, the name of several towns in France, of which we shall only observe here that Chatillon sur-Seine [CÔTE D'OR] was the scene of fruitless negotiations between Napoleon and the allied powers before the capitulation of Paris, 1814; and that the castle of Chatillon-sur-Loire [LOIRET] was the property of the great Coligni, hence called 'the admiral of Chatillon.'

CHATOE'SSUS, a genus of fishes of the herring family. [CLUPEIDÆ.]

CHATRE, LA, a town in the department of Indre, in France, on a cross road leading from Châteauroux to Guéret. It is 159 miles S. by W. of Paris, in 46° 35′ N. latitude, and 1° 59′ E. longitude.

This little town is situated in a pleasant country, on a gentle slope, on the left bank of the river Indre. The inhabitants, who amount to 3913 for the town, or 4343 for the whole commune, manufacture some serges, and trade in cattle, wool, and leather. It is the capital of an arrondissement, which contained in 1832 52,497 inhabitants.

CHATSWORTH, an extra parochial liberty, in the hundred of High Peak, county of Derby, 3 miles from Bakewell, and 16 from Buxton, is the seat of the duke of Devonshire, who is constable of the Peak. The present mansion stands on the site of a former one, in which Mary, queen of Scots, passed the greater part of her long captivity in England, and which, during the civil wars, was alternately in possession of the parliamentarians and royalists, and withstood the siege of the parliamentarian troops in 1645. It was taken down at the close of that century to make room for the present beautiful structure, which was not completed until 1706. During the time that it was building, it was the residence of Marshal Tallard, the French general, who had been made a prisoner at the battle of Blenheim. The house is built in the Grecian style, with Ionic columns, with a flat roof and balustrade round it. It is about 190 feet square, inclosing a court with a fountain in the centre. The stone was hewn out of a neighbouring hill. The park is ten miles in circumference, through which, and in front of the mansion, flows the Derwent. The water-works, which are so ornamental to the pleasure grounds, are supplied from a reservoir on the summit of the nearest hill. Chatsworth is part of the duchy of Lancaster, and within the jurisdiction of a court of pleas held at

Chapel en le Frith for the recovery of debts under 40*s*; but its population is returned with the parish of Edensor

CHATTELS (Catalla). This term comprehends all property moveable or immoveable, which are not freehold. Chattels are called real, which, in the language of the earlier law writers, savour of the reality; that is, relate to or are interests in land. Chattels personal are moveable goods, as horses, plate, money, &c. Chattels of each description pass to the personal representatives of the deceased proprietor, and are comprehended under the general term 'personal property.' The laws which govern this description of property are now, from the growth of the mercantile system and the change of manners, equal in importance with those relating to realty; but during the prevalence of the feudal system, and the laws to which it more immediately gave rise, chattels (including even terms for years) were considered of small importance in a legal point of view, and, indeed, prior to the reign of Henry VI., were rarely mentioned in the law treatises and Reports of the day. (Reeve's *Hist. Eng. Law*, 369.) Many articles of property, intrinsically chattels, from their intimate connexion with other property of a freehold nature, and being necessary to its enjoyment, descend therewith to the heir, and are not treated as chattels. Thus, for instance, the muniments of title to an estate of inheritance, growing trees and grass, deer in a park, and such fixtures as cannot be removed from the freehold without injury to it, are not chattels, because they pass to the heir. In the hands of a person however who has a limited interest in such things, they become his chattels, and pass to his executor. Chattels, except so far as they may be impressed with the nature of heir-looms, cannot be entailed, though they may be limited so as to vest within 21 years after the death of a person or persons in being. They are not within the statute of Uses, inasmuch as the proprietor of a chattel is said to be *possessed* of it, not *seised*, which is the word used in that statute: nor are the same formalities required in passing a chattel by devise, as in the case of real property. A will of chattels may also be at an earlier age than one which disposes of real estate; at fourteen years of age by a male, and twelve by a female. They do not go in succession to a corporation sole, except only in the cases of the king and the chamberlain of the city of London. (Co. Litt.; Bl. *Comm.*)

CHATTERTON, THOMAS, was born at Bristol on the 20th of November, 1752. His father (who died three months before the birth of his son) was a singing master at the cathedral, and also master of a charity school in Pyle-street. At the age of five years he was placed under the care of Mr. Love, who succeeded his father as master; but his progress was so slow, that after his master had exhausted his patience in attempting to teach him, he sent him back to his mother as a 'dull boy, and incapable of further instruction.' His mother now took him under her care, and at the age of six years he first learned his letters from the illuminated capitals of an old musical MS., with which, to use her expression, he 'fell in love;' and it is probable that his passion for antiquarian pursuits received its first impulse from this circumstance. His progress was now as rapid as it had before been slow; books of all kinds, but more especially those which treated of ancient customs, were his chief companions. On the 3rd August, 1760, when not quite eight years of age, he was admitted into Colston's school, Bristol, an establishment much upon the same plan with Christ's Hospital, in London. He remained here seven years, during which time he wrote some minor pieces of poetry, chiefly satirical, and the celebrated De Bergham pedigree. On the 1st July, 1767, he left the charity school, and was bound apprentice to Mr. John Lambert, attorney, of Bristol, for seven years. While in Mr. Lambert's service he communicated to Felix Farley's Bristol Journal the article by which he first attracted attention. In the beginning of October, 1768, the new bridge at Bristol was completed, and at that time there appeared in Farley's Journal an article purporting to be the transcript of an ancient MS., entitled, 'A Description of the Fryars first passing over the Old Bridge, taken from an Antient Manuscript.' This paper, so singularly curious, and exhibiting such strong powers of invention, was traced to Chatterton, who was at first rather harshly interrogated as to the manner by which it came into his possession. After several contradictory statements, he asserted that he had received the paper in question from his father, who had found it, with many others, in some chests in Redcliff church, where they had been deposited in the muniment room, in 'Canynge's cofre.' Soon after this occurrence he became acquainted with Mr. Catcott, a gentleman fond of antiquarian researches, and with Mr. Barrett, surgeon, who was engaged in writing a history of Bristol. To the former gentleman he took, very soon after his introduction to him, some of the pretended Rowleian poems, among which were 'The Bristow Tragedy,' Rowley's Epitaph upon Mr. Canynge's Ancestor, with some other small pieces. This Rowley, according to Chatterton, was a priest of the fifteenth century, who had been patronized by Canynge. (BRISTOL, p. 432.) He shortly afterwards presented to Mr. Catcott the Yellow Roll. To Mr. Barrett he furnished an account of every church and chapel in Bristol, which he stated to have been found by him among the old parchments. The pretended originals bore all the marks of antiquity, which he had made them assume by rubbing them with ochre, stamping on them, and blacking them in the chimney, or by the flame of a candle. Mr. Barrett published these statements in his work, fully believing them to be genuine. After his introduction to these gentlemen Chatterton's ambition increased daily, and he often spoke in raptures of the undoubted success of the plans that he had formed for his future life. His pursuits were various—heraldry, English antiquities, metaphysics, mathematics, astronomy, music, and physic, by turns occupied his attention; but the two first were his favourite pursuits.

His attention, however, was not confined to the Rowley poems. He wrote various pieces, chiefly satirical; and several essays, both in prose and verse, which he forwarded to the periodicals of the day. Most of his pieces appeared in the 'Town and Country Magazine.' Growing disgusted with a profession ill suited to his tastes, and with a master whom he disliked, he made an application in March, 1769, to Mr. Horace Walpole: the ground of which was an offer to supply him with some accounts of a succession of painters who had flourished at Bristol, which Chatterton affirmed to have been lately discovered, with some old poems, in that city. Walpole accepted the offer with warmth, but afterwards seems to have cooled upon it, either from suspecting the forgery of the accounts, or ascribing but little value to them; and on being importuned by Chatterton for his assistance to release him from his profession, he neglected to answer his letters. At last, when he had received a dignified and spirited letter from Chatterton, demanding his MSS. (a letter which he termed 'singularly impertinent'), he returned the MSS. and letters in a blank cover.

Being determined to relinquish his profession, Chatterton made every effort to accomplish this object. The idea of suicide became familiar to his mind, and he often intimated to Mr. Lambert's servants that he would put an end to his existence. On hearing this the family of his master became alarmed; but Mr. Lambert himself could not be persuaded that his threats meant anything, until he found one day on his desk a paper entitled, 'The last Will and Testament of Thomas Chatterton,' in the following terms —'This is the last will and testament of me, Thomas Chatterton, of the city of Bristol, being sound in body, or it is the fault of my last surgeon; the soundness of mind the coroner and jury are to be judges of, desiring them to take notice that the most perfect masters of human nature in Bristol distinguish me by the title of the mad genius; therefore if I do a mad action it is conformable to every action of my life, which all savoured of insanity. Item. If, after my death, which will happen to-morrow night before eight o'clock, being the feast of the resurrection, the coroner and jury bring it in lunacy, I will and direct,' &c. &c. This alarmed Mr. Lambert, who considered it imprudent to keep him any longer, and accordingly he dismissed him after he had been in his service about two years and nine months.

Chatterton went up to London, having received liberal offers from the booksellers. 'My first attempt,' said he, 'shall be in the literary way: the promises I have received are sufficient to dispel doubt; but should I, contrary to my expectation, find myself deceived, I will in that case turn Methodist preacher. Credulity is as potent a deity as ever; and a new sect may easily be devised. But if that too should fail me, my last and final resource is a pistol.' His first letters from London to his mother and sister are full of enthusiasm. 'I am settled,' says he, 'and in such a settlement as I can desire. What a glorious prospect!' Party-writing seems to have been one of his favourite employments. It was agreeable to his satirical turn,

and by raising him into immediate notice gratified his pride, which was unbounded. When recommended by a relation to get into some office, he stormed like a madman, and asserted that 'he hoped, with the blessing of God, very soon to be sent prisoner to the Tower, which would make his fortune.' His writings during his residence in London were numerous; but they failed to procure him a comfortable income, and he was plunged from the highest pinnacle of hope to the depths of despair. In the month of July, 1770, he removed from Shoreditch, where he had lodged, to an apartment in Brook-street, Holborn, where, on the 24th of August following, being literally in a state of starvation, he terminated his existence by poison. He was buried on the following day in the burying-ground of Shoe-lane workhouse.

Chatterton was only seventeen years and nine months old when he died. The controversy as to the Rowleian poems engaged numerous writers of the day; but few people now believe the Rowley poems to be anything else than the production of Chatterton himself.

No monument has yet been erected to the memory of the boy-bard of Bristol. The circumstances attending his death have hitherto prevented any such testimonial; but while the beautiful church of St. Mary Redcliff stands, with which his name is inseparably associated, he will not need any other monument; and in the construction of the Rowley poems, he himself built,

'Ere his young days were spent,
An early but enduring monument.'

The person of Chatterton was, like his genius, precocious. One of his companions says he looked 'like a spirit.' His eyes were uncommonly piercing, and one more so than the other. His habits were domestic, and his affection for his relatives unbounded. The two following passages, one from the Rowleian papers, and the other from one of his acknowledged poems, may be safely pronounced to be from the same hand, notwithstanding the antiquated disguise of the passage from the Rowley papers:—

'The gatherd storme is rype; the bigge drops falle;
The forswat meadowes smethe, and drencke the raine;
The comynge ghastness do the cattle pall,
And the full flockes are drivynge o'er the plaine;
Dashde from the cloudes the waters flott again;
The welkin opes; the yellow levynne flies;
And the hot fierie smothe in the wide lowings dies.'
Balade of Charitie

Pale rugged Winter bending o'er his tread,
His grizzled hair bedropt with icy dew;
His eyes, a dusky light, congeal'd and dead;
His robe, a tinge of bright ethereal blue.

'His train, a motley'd, sanguine, sable cloud,
He limps along the russet dreary moor;
Whilst rising whirlwinds, blasting, keen, and loud,
Roll the white surges to the sounding shore.'
Elegy to the Memory of Mr. Thomas Phillips.

The last edition of Chatterton's works is in 3 vols, 1803.

CHAUCER, GEFFREY, a very distinguished name in the long catalogue of eminent Englishmen. He lived much in the court of Edward III., and in familiar intercourse with several members of his family. He was also employed in the public affairs of the realm. But it is as a writer, and especially as a poet, that he claims the notice of posterity. Most of the scholars of his age were accustomed to write in Latin, but Chaucer wrote in the vernacular language of his own age and country: he refined it indeed, but neither his labours, nor those of his contemporaries, Longland, Gower, and Wickliffe, were able to fix the language. The English of Chaucer is so unlike the English of our time, that few persons can read it with ease, and none without the assistance of a dictionary. Yet a little pains would enable any one to master his language and versification, and the pains would be amply rewarded, for his writings are valuable not only as illustrating the manners and habits of the time, but as the productions of a mind eminently poetical. His chief work is a collection of stories, entitled by him, 'Canterbury Tales,' being a series of tales told by the individuals of a party of pilgrims going from Southwark to Canterbury, who had agreed thus to beguile the tediousness of the way. A competent judge, the late Mr. Godwin, says, that 'after the dramas of Shakspeare there is no production of man that displays more various and vigorous talent.'

The æra of Chaucer was the reigns of Edward III. and Richard II., for he was born within a year or two of the accession of Edward, and he died in 1400, soon after the deposition and death of Richard. His most remarkable contemporary was Wickliffe, and it is to the honour of John of Gaunt, one of the sons of King Edward, that he was the associate, friend, and patron, of both these illustrious men.

Chaucer has himself told us that London was the place of his nativity. He was educated at Cambridge, and also at Oxford, and some of his biographers represent him to have gone to Paris, then one of the most celebrated schools of the sciences in Europe. He studied the law, moreover, in the Inner Temple.

While at the university he produced two of his larger works, the 'Court of Love,' and 'the book of Troilus and Cresseide;' but he soon entered on public life. Whether his marriage was the cause or effect of his connexion with the court is not completely ascertained: some would refer his marriage to so late a date as 1370, but this proceeds upon the presumption that his wife was Philippa Pycard, an attendant on Queen Philippa, who appears not to have been married before that year. The old biographers of Chaucer, with some probability, represent him to have been married some years earlier, and to have taken to wife another lady of the court of Queen Philippa, also named Philippa, a daughter of Sir Payne Roet, of Hainault, and sister of Katherine Swinford, the mistress, and afterwards the wife, of John of Gaunt, the mother of the Beauforts.

In 1358 John of Gaunt married Blanch of Lancaster. It was on occasion of this suit or courtship that Chaucer wrote his 'Parliament of Birds.'

In the next year he appears as a soldier. One of the most authentic and interesting memorials we possess of him is a deposition given by him in the suit between Scrope and Grosvenor, on the question of right to a particular figure in their coat armour. The depositions are preserved on the rolls at the Tower. Chaucer deposes among other things, that he was in the expedition of 1359, when Edward III. invaded France, and was then made prisoner by the French, near the town of Retters. How long he remained in captivity is not known, and it is not till 1367 that we meet with him again in the national records, which are almost the only deposits of authentic information concerning the illustrious Englishmen of that period. In that year he had an annual pension of twenty marks granted to him, a sum which his biographer, Mr. Godwin, estimates as equivalent to 240*l.*; the grant is entered on the patent rolls there is proof of the payment of it in the issue roll of the Exchequer of the 44th year of Edward III., and also of the payment of ten marks a year, granted to Philippa Chaucer, his wife.

In 1369 he wrote 'the book of the Duchess,' a funeral poem, on the death of Blanch, duchess of Lancaster.

It is by the light of the national records that we are enabled to trace other facts in the life of Chaucer. In 1370 he had letters of protection, being about to depart beyond sea. In 1373 he was in an embassy to Genoa, to treat on some public affairs. This visit to Italy was one of the most remarkable events in his life, inasmuch as it seems probable that he there saw and conversed with Petrarch, of whom he speaks in the induction to one of his tales. On his return, he had a royal grant of a pitcher of wine, to be taken daily at the port of London, and was soon after made comptroller of the customs in that port. He is found also on the rolls as having a grant of a wardship in 1375, and another of a portion of contraband wool in 1376. About this time it is supposed that he wrote the poem which Pope afterwards modernized, called by him the 'House of Fame.'

In 1377 he was employed in an embassy of a delicate and honourable nature. It was to negotiate a marriage between Richard, prince of Wales, and Mary of France, daughter of the French king.

King Edward III. died in May, 1377. To the early years of his successor are referred Chaucer's poems entitled 'The Black Knight,' 'The Legend of Good Women,' and 'The Flower and the Leaf.' If Mr. Godwin's authorities are sufficient, it would appear that he was in disgrace and misery during much of the period from 1384 to 1389. He is represented as having been implicated in the affairs of John de Northampton, in his struggle for the mayoralty of London, and to have been in consequence driven into exile, flying to Hainault, and afterwards to Zealand, and on his return to England being imprisoned in the Tower, from whence he was not released but at the expense of some disclosures, which are said not to have been creditable to him. It is remarkable, however, and it renders somewhat doubtful what is above stated respecting him, that in 1386 he was returned a knight of the shire for Kent, and that in 1389

he was appointed clerk of the works, an office which he did not long hold.

In the last ten years of his life he seems to have lived retired from public affairs, though receiving from time to time marks of royal favour. A house at Woodstock, which had been assigned to him by the king, and the castle at Donnington, near Newbury, the ruins of which are visible on the right hand of the road from London to Bath, are believed to have been at this period his usual place of abode. It is certain that it was in this part of his life that he wrote the 'Canterbury Tales,' and the tradition, both at Woodstock and at Donnington, is, that portions of the work were written at those places. All his biographers concur in saying that he died in London, and it is certain that he was buried in the Abbey Church of Westminster. The monument which is there erected to his memory was a tribute paid to him, a century and a half after his decease, by Nicholas Brigham.

Chaucer had two sons, Sir Thomas and Lewis; of the latter little is known, but Sir Thomas was speaker of the House of Commons, and, marrying an heiress of the house of Burghersh, obtained with her Ewelme, in Oxfordshire, and other possessions. He had an only daughter, Alice Chaucer, who married De la Pole, duke of Suffolk.

The 'Canterbury Tales' were printed by Caxton, but it was not till 1542 that any general collection of his writings was made and committed to the press: they have been often reprinted. Mr. Tyrwhitt's edition of the 'Canterbury Tales' is justly celebrated for the greater purity of the text, and for the valuable illustrations which he has annexed.

We have noticed in this article Chaucer's principal works, without professing to enumerate all. Warton, in his 'History of English Poetry,' thus sums up the poetical character of Chaucer:—

'In elevation and elegance, in harmony and perspicuity of versification, he surpasses his predecessors in an infinite proportion: his genius was universal, and adapted to themes of unbounded variety: his merit was not less in painting familiar manners with humour and propriety, than in moving the passions, and in representing the beautiful and the grand objects of nature with grace and sublimity. In a word, he appeared with all the lustre and dignity of a true poet, in an age which compelled him to struggle with a barbarous language and a national want of taste, and when, to write verses at all, was a singular qualification.'—*History of English Poetry*, vol. i., p. 457.

CHAUCI, a nation of antient Germany, who lived N.E. of the Frisii, along the coast of the N. ocean, and on both banks of the Visurgis (Weser) and as far as the Albis, or Elbe. To the S. they bordered upon the Catti. Tacitus (*German.* 35) says that their country was extensive and thickly inhabited, and that they were a people distinguished among the Germans for their love of justice and of peace; powerful and yet unambitious, they did not provoke war, but were always ready to resist aggression. They were at one time friends to Rome, and furnished auxiliaries to Germanicus in the war against the Cherusci. (*Annal.* i. 60, ii. 17.) But later, under Claudius, we find the Chauci, under Gannascus, a chief of the Batavian tribe of the Canninefates, crossing the Rhine to make incursions into the Roman province of Germania Inferior, but they were driven away by Corbulo, and Gannascus was killed. (*Annal.* xi. 18.) They afterwards joined in the revolt of the Batavian chief, Civilis. (*Histor.* iv. 79, v. 19.) The Chauci do not appear to have ever been permanently subjugated by the Romans.

CHAUDET, ANTOINE DENIS, a French sculptor, who is entitled to distinction, chiefly for having been among the first who broke through the trammels in which a perverted and bad taste had long confined art. He was born in 1760, at which period a style of design prevailed in which purity and simplicity, both of form and expression, were entirely superseded by affectation and over-attention to unworthy minutiæ of detail.

Chaudet began to study his art at an early age, and obtained the prize from the French Academy for a basso-rilievo of Joseph sold by his brethren, in which, according to the taste of the school in which he was educated, he introduced every sort of accessory—landscape, cattle, a bridge, &c. Upon seeing this work in after-life, he remarked, 'I wonder they did not order me to represent rain. I should have obeyed them.' He afterwards went to Italy, where he diligently studied the antique and the works of Raffaello. His own productions have great merit, particularly as regards the composition, invention, and improved taste displayed in them; in the execution they are open to criticism. Chaudet was a member of the 'Institut,' and contributed to the 'Dictionnaire de la Langue des Beaux Arts.'

CHAUDIÈRE. [CANADA.]

CHAUFFPIE'. [BAYLE.]

CHAULIODUS, a genus of fishes belonging to the abdominal malacopterygians. [STOMIAS.]

CHAUMONT, a town in France, capital of the department of Haute Marne, on the road from Paris to Langres, Belfort, and Bâle or Basel. It is on the left bank of the Marne, and near the right bank of the little river Sure or Suize, which flows into the Marne just below the town; 139 miles E.S.E. of Paris in a straight line, or 148 miles by the road through Provins, Troyes, and Bar-sur-Aube. 48° 7′ N. lat. and 5° 8′ E. long.

Chaumont was originally an insignificant place with a castle called Haute-Feuille, which belonged first to its own lords, afterwards to the counts of Champagne, though it was in the domain of the bishops of Langres, to whom those counts paid homage. The town was walled in by Louis XII., in 1500, and some fortifications were added by his successors, François I. and Henri II. All these fortifications were, in the middle of the last century, falling into ruin; but in 1821 they were repaired, and Chaumont ranks again among fortified places. In 1814, Russia, Prussia, and Austria, here concluded a treaty of alliance against Napoleon.

Chaumont is a handsome town, built on the slope of a hill the town-hall, the portico of the church or chapel attached to the high school, and the hospital, are worthy of notice. The inhabitants, who amount to 6104 for the town, or 6318 for the whole commune, manufacture druggets and other woollens, gloves, which are in high repute, linen, hosiery, cutlery, and candles; and trade in corn, and in sheep fed in the neighbouring country for the supply of Paris. There is a college or high school, an agricultural society, and a theatre.

The arrondissement of Chaumont had, in 1832, a population of 81,965. Bouchardon, an eminent sculptor, was a native of this town.

CHAUNA. [PALAMEDEIDÆ.]

CHAUNY, a town in France, in the department of Aisne; it is on the river Oise, the navigation of which commences here, 65 miles N.E. of Paris in a direct line, or 70 miles by the road through Senlis, Compiègne, and Noyon.

The town is pleasantly situated, and the inhabitants, who amount to 4290, carry on considerable commerce, favoured not only by the navigation of the Oise, but also by the junction here with that river of a canal which communicates with Peronne, St. Quentin, and Cambray. The inhabitants manufacture linens, sacking, cotton-yarn, knit woollen socks, and leather. The looking-glasses of St. Gobain are polished here, for which purpose there is an hydraulic machine. Beside the above articles, the inhabitants trade in wood, grain, cider, oil, horses, &c.

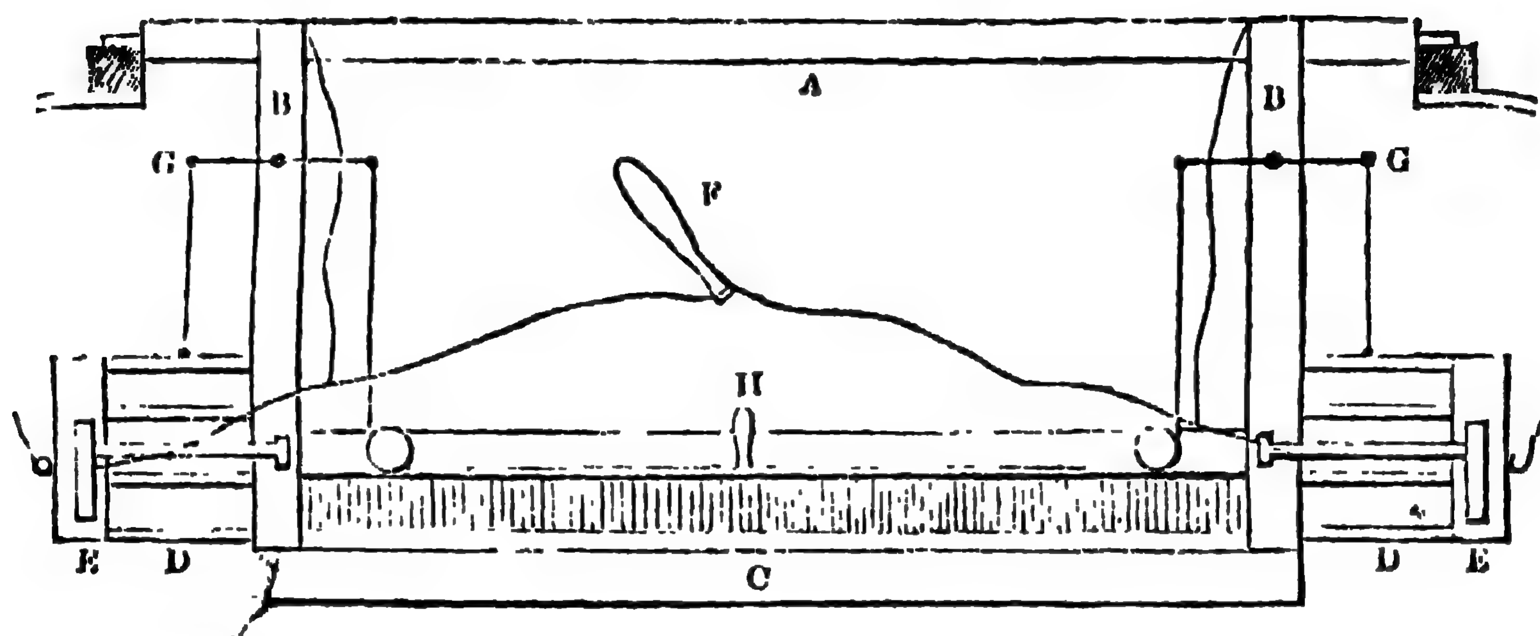
CHAUSSEY, a small island belonging to France, in the English Channel; it belongs to the department of Manche, and is the principal of a cluster of islands nearly opposite to the town and port of Granville, distant about 10 miles. Its length, measured on Brué's map of France, is about 2 miles, the breadth half as much: but the geographical dictionaries of France (Expilly and the *Dictionnaire Universel*), exaggerate these dimensions. This island was once inhabited by hermits, who here sought retirement from the world. At a subsequent period there was a convent of Cordeliers, containing many of those monks; but the English having twice pillaged the convent, the monks withdrew to the main land. Since their retirement the place has been inhabited only in summer, by the workmen who come from Granville to quarry granite, which is here found of good quality, but hard to polish. It is used for building at Granville and St. Malo. The smaller islands of the group are many of them inhabited.

CHECK, a species of chequered cloth, in which coloured lines or stripes cross each other rectangularly, like a chess board. This manner of beautifying webs is probably very antient. Many of the figures in Rosellini's Egyptian work are dressed in chequered cloths. Bishop Anselm's book concerning *Virginity*, written about the year 680, when

the art of weaving in this country was probably in a comparatively rude state, contains a distinct indication that chequered robes were then in fashion. 'It is not a web of one uniform colour and texture, without any variety of figures that pleaseth the eye and appeareth beautiful, but one that is woven by shuttles, filled with threads of purple, and many other colours flying from side to side, and forming a variety of figures and images in different compartments with admirable art.' These compartments, defined and bounded by coloured threads, constitute the fabric called a check. Sometimes, however, the check is formed, not by differently coloured threads, but by threads of different fineness and quality. Thus if the chain, warp, or longitudinal yarns of the web be composed of alternate parcels of white cotton and woollen threads, and the transverse yarns or the woof be also composed of such alternate parcels, we shall have a check very distinctly brought forth without any distinction of colour, properly so called.

Cotton handkerchiefs chequed of various colours have been manufactured in India probably from time immemorial under the name of *pullicates*. They were first imported into this country from Madras, whence they derived the name by which this style is still known in the trade. The ground of these has usually a pale buff colour, and is woven with the nankin yellow cotton. Checks in this country are mostly manufactured for the coarser purposes of seamen's shirts, aprons, and bed-gowns of females in the lower ranks of life. The quantity required is so great as to make it a very important branch of business, and to render every mechanism which facilitates the fabrication an object of consequence. Blackburn, in England, and Kirkaldy, in Scotland, are the two chief seats of the check trade, the former in cotton, and the latter, till of late years, chiefly in linen yarns.

For the decussation of woof yarns of different kinds or colours in one web, different shuttles must be in readiness for alternate use. The mode in which this is effected is shown by the figure.



Here we see the picking peg F, which the weaver seizes in his right hand, and with a dexterous jerk causes one of the shuttles lodged in the separate cells at DD, to move from the one side of the loom to the other across the line of the warp, by means of the string which extends from that peg to the drivers or peckers EE, seen at the end of the cells. The three shuttle boxes here shown are so constructed as to be made to slide up and down in a vertical plane, so that each box with its appropriate shuttle may at pleasure be brought on a level with the shuttle race, or open shedding of the warp, and thus be thrown across. These three boxes are suspended by cords from the cross levers G, G, which turn upon centres, in the suspending bars marked B, B, or the swords of the lay; being the levers which make it vibrate backward and forwards in the act of weaving. A represents the cross bar of wood on which the lay C oscillates upon iron gudgeons, or pins driven into each of its ends, and resting upon the upper rails of the loom as shown in section. The under part of the lay is seen at C, and the upper part, called the lay-cap, H, is seized by the weaver's left hand in driving home each shute or shoot of weft. The two pieces of buffalo hide called the drivers or peckers E, E, are perforated, and traverse or slide horizontally upon smoothly polished iron rods. These pieces give the immediate impulsion to the shuttle. The weavers' twitch at the picking peg H must be sufficiently smart to communicate adequate velocity to the shuttle, so as to lodge it in the opposite box, and overcome its friction along the warp race, without however giving it too forcible a pull, which might do injury to its point, or throw it out of the shed. The pin H is made to slide freely from right to left upon the upper bar of the lay, and thus give such motion to the levers G, G, as may bring the proper box opposite to the shuttle driver.

As diversity of woof renders diversity of shuttles necessary, it becomes expedient to shift them rapidly, otherwise the operation would be much impeded. The above plan is not the one originally employed, but is in many respects better. The pin H being fixed by friction only, so as to slide from right to left on the upper shell of the lay, the levers G, G, connected with it may be readily moved, being within reach of the weaver's hand, as he works the lay. The driver, if drawn forward, would present an obstruction to the shifting of the boxes, but this may be easily avoided by an experienced operative.

Mr. Robert Kay, of Bury, son of the most ingenious but persecuted inventor of the fly shuttle, invented the above-described drop box, for making checks, by means of which, as we see, the weaver could at pleasure use any one of three shuttles without rising from his seat, each shuttle containing a differently coloured weft.

CHEDDAR, a decayed village in Somersetshire, near the stupendous chasm in the Mendip Hills, known by the name of Cheddar Cliffs. Cheddar is said to be derived from *ced*, a conspicuous brow, or height, and *dwr*, water. The village consists of three or four irregular streets. It was formerly a market-town. In one of the streets a beautiful old market-cross is still standing. The population of the parish in 1831 was 1980.

An extensive flat, called Cheddar Moor was, until within these few years, covered with British barrows, or tumuli; but all trace of these has been destroyed by cultivation and enclosure.

Cheddar Cliffs are the sides of a chasm, extending across one of the highest ridges of the Mendip Hills. 'The chasm across the diameter of Mendip is more than a mile in length. The opening yawns from the summit to the roots of the mountain, laying open a sublime and tremendous scene, exhibiting a combination of precipices, rocks, and caverns of terrifying descent, fantastic form, and gloomy vacuity. The approach from the village is extremely picturesque.' (Rutter's *Delineations of the North-Western Division of Somerset.*)

The entrance to one of the caves in these cliffs is nearly 100 feet above the valley; and it is stated to penetrate upwards of 300 feet beneath the rocks. A rough carriage road winds for nearly two miles through the cliffs, until it reaches the summit of the hills.

Nine springs rise from the foot of the rocks, and almost immediately uniting, form a clear and beautiful stream, called Cheddar Water, which falls into the Ax.

The greater part of the land between Axbridge and Cheddar has the appearance of a continued garden. It is sheltered by the Mendip Hills on the N. and E., and is chiefly occupied in the culture of vegetables; large quantities of which are obtained early in the season, and forwarded to Bristol.

CHEESE, caseous matter or caseum, one of the component parts of milk, which may be considered under two points of view; first as uncoagulated, and secondly in a state of coagulation, in which it resembles fibrin and albumen. Uncoagulated caseous matter exists in solution in milk. In order to obtain it, skimmed milk is to be mixed with dilute sulphuric acid, which combines with and precipitates it in the state of a white clot; this is to be washed on a filter to deprive it of the milk which it contains, and it is then to be mixed with water, and digested with carbonate of lime or barytes. The acid combines with

the earth, and the caseous matter separated dissolves in the water; it is to be freed by filtration from the earthy salt and butter which are mixed with it.

The filtered solution of caseous matter is of a pale yellow colour, and rather mucilaginous, like a solution of gum. When evaporated, it exhales a smell of boiled milk, and is gradually covered with a white pellicle, which may be removed like that which forms on milk. By evaporation to dryness, the caseous matter remains as a dry mass of an amber colour, which may be redissolved in water.

The aqueous solution is coagulated by acids, even by the acetic acid, especially when heated. When a strong aqueous solution of caseous matter is kept, it changes, emits a smell of old cheese, soon putrefies, and yields ammonia.

Acids act upon caseous matter very much in the same way as upon albumen; with a small portion of acid it forms a compound which is soluble in water; and with a larger quantity of the same acid even, the compound is but slightly soluble; but when it is deprived of the excess of acid by washing, it again becomes soluble in water. The character which principally distinguishes caseous matter from albumen is the precipitation of the former by acetic acid; this precipitate may be indeed redissolved by acetic acid, but it requires much more than albumen does. It is soluble in alcohol. Caseous matter is dissolved by cold weak solutions of the alkalis, without suffering any change; but when they are strong and heated, the caseous matter is decomposed, ammonia is evolved, and the solution contains an alkaline sulphuret; tannin decomposes both the aqueous and alcoholic solution of caseous matter.

It has been already observed that caseous matter may exist both in an uncoagulated and in a coagulated state; what has been already mentioned relates to it in the former condition. The coagulation of caseous matter occurs in a mode which is peculiar to this substance; it is not effected by boiling, but it takes place when either the aqueous solution of caseous matter or milk itself is gently heated with the mucous membrane of the stomach of a young calf, or what is called *rennet*.

According to Berzelius, the action of this substance has not been hitherto explained. In order to investigate the subject, he washed and dried the stomach of a calf, and yet he found that one part of this mixed with 1800 parts of skimmed milk, and heated to 122° Fahrenheit until the operation was complete, so perfectly coagulated the caseous matter that no trace of it remained in solution. When caseous matter coagulated by rennet is burnt, it leaves 6½ per cent. of ashes, which are principally phosphate of lime, precipitated by the rennet from the milk in combination with the caseous matter.

According to Gay-Lussac and Thénard, caseum consists of

Carbon	59·781
Oxygen	11·409
Hydrogen	7·429
Azote	21·381
	100·

Berzelius, however, considers that this analysis is not correct, because the substance analyzed contained, as he states, lactic acid and butter.

The poorer kinds of cheese consist almost entirely of caseum, while the better sorts contain a considerable quantity of butter mixed with it. Cheese obtained from skimmed milk, which contains but little butter, is hard, translucid, yellowish, and has a greasy lustre, owing to a small quantity of butter which it contains, and which may be separated by æther without altering its properties. When put into water, it swells and softens, but does not dissolve. When strongly heated, it softens without melting, may be drawn into threads, and becomes elastic like caoutchouc. At a higher temperature, it melts, swells, burns with flame, and yields ammonia. Its compounds with acids and alkalies are generally similar to those of uncoagulated caseum; but when the acid is removed by carbonate of lime, the residual caseous matter, being in a coagulated state, is not dissolved by water, as the uncoagulated is under similar circumstances.

When cheese has been long kept, it undergoes peculiar changes; when recently coagulated, it contains nearly 80 per cent. of liquid, which is removed by pressing and drying; it may then be kept for a long time, and becomes more agreeable to the taste. When cheese has not been carefully pressed, it undergoes a peculiar kind of putrefaction; and, according to Proust, two substances, which he calls caseous oxide and caseic acid, are produced. Braconnot has since examined the subject. He mixed about 9 ounces of fresh cheese from skimmed milk with nearly 4½ pints of water, and suffered the mixture to putrefy during a month between 62° and 77° of Fahrenheit; the greater part of the cheese dissolved, and the solution was filtered; it had a putrid smell, but contained no sulphur in any form; and by evaporation to the consistence of honey, it became, after some time, a granular mass, one part of which was soluble and another insoluble in alcohol; the latter was dissolved in water, and the solution, rendered colourless by animal charcoal, yielded by spontaneous evaporation small brilliant slender crystals in the form of rings and cauliflowers; but in order to render these white, it was requisite to dissolve and crystallize them several times. Instead of caseous oxide, Braconnot called this substance *aposepidine* (from ἀπὸ and σηπεδὼν, produced by putrefaction). It has the following properties it is inodorous, taste rather bitter, but somewhat like that of roast meat; it is gritty between the teeth, heavier than water, easily pulverized; it burns totally; and when heated in a tube open at both ends, part sublimes, without suffering any change, in slender crystals; and another portion is decomposed. When heated on silver, it blackens it, on account of the sulphur which it yields. It is soluble in 22 parts of water at 57° Fahrenheit; the solution readily putrefies and exhales a very disagreeable smell. In alcohol it is but slightly soluble, but most readily so when hot; the solution, on cooling, deposits the aposepidine in the state of a fine white powder. Muriatic acid dissolves a larger quantity than water: neither alum nor persulphate of iron precipitates the aqueous solution; but infusion of galls occasions an abundant precipitate, which an excess redissolves.

The substances contained in the decayed cheese, which the water did not dissolve, were oleic acid coloured brown by an animal matter, a little margaric acid, much margarate of lime, the base of which was derived from the lime existing in the caseous matter, whilst the acids came from the butter.

It has been observed that badly prepared cheese has sometimes, though rarely, become poisonous by keeping. The cause of this change has not been ascertained.

CHEESE. The milk of animals consists of three distinct substances, which are separated from one another by a slight change, which begins as soon as it is exposed to the air. The oily part rises to the surface by its less specific gravity; and when it is collected into a solid mass by agitation it forms butter; the curd, coagulated by the action of any acid, and pressed, becomes cheese; and the fluid which rem[illegible] the serum or whey.

In the making of chee[illegible] there are certain general principles which are essential, but slig[illegible] in the process produce cheeses of very different qualities; and although the most important circumstance is the nature of the pasture on which the cows are fed, yet much depends on the mode in which the different stages of the fabrication are managed: and hence the great superiority of the cheeses of particular districts or dairies over those of others, without any apparent difference in the pasture. By skill and great attention excellent cheeses are made in places where the pastures are not considered so well adapted to produce milk of a proper quality; and in those countries where the cows are chiefly kept tied up in stalls, and are fed with a variety of natural and artificial grasses, roots and vegetables, superior cheese is often made.

The first process in making cheese is to separate the curd from the whey, which may be done by allowing the milk to become sour, but the cheese is inferior in quality, and it is difficult to stop the acid fermentation and prevent its running into the putrefactive. Various substances added to milk will soon separate the curd from the whey. All acids curdle milk. Muriatic acid is used with success for this purpose in Holland. Some vegetables contain acids which readily coagulate milk, such as the juice of the fig-tree, and the flowers of the *Galium verum*, or yellow lady's bed straw, hence called *cheese-rennet*. Where better rennet cannot be procured, they may be substituted for the most natural curdler of milk, which is the gastric juice of the stomach of a sucking calf. This juice rapidly coagulates the milk as the calf sucks; and the only difficulty is in collecting and keeping it from putrefaction, which begins from the instant the stomach is taken from the calf. The

preparation of the *rennet*, as it is called, is a most important part of the process of cheese-making. The following may be considered as the simplest, and perhaps the best. As soon as a sucking calf is killed, the stomach should be taken out, and if the calf has sucked lately, it is all the better. The outer skin should be well scraped, and all fat and useless membranes carefully removed. It is only the inner coat which must be preserved. The coagulated milk should be taken out and examined; and any substance besides curd found in it should be carefully removed. The serum left in it should be pressed out with a cloth. It should then be replaced in the stomach with a large quantity of the best salt. Some add a little alum and sal prunella; others put various herbs and spices, with the view of giving the cheese a peculiar flavour, but the plain simple salting is sufficient. The skins or vells, as they are called, are then put into a pan, and covered with a saturated solution of salt, in which they are soaked for some hours; but there must be no more liquor than will well moisten the vells. They are afterwards hung up to dry, a piece of flat wood being put crosswise into each to stretch them out. They should be perfectly dried, and look like parchment. In this state they may be kept in a dry place for any length of time, and are always ready for use. In some places, at the time of making cheese, a piece of a vell is cut off and soaked for some hours in water or whey, and the whole is added to the warm milk. In other places, pieces of vell are put into a linen bag and soaked in warm water, until the water has acquired sufficient strength, which is proved by trying a portion of it in warm milk. The method employed in Switzerland is as follows:—A dry vell is taken and examined; it is scraped with a knife, and where any veins or pieces of tough membrane appear they are removed. The whole surface is examined and washed carefully, if any dust or dirt has adhered to it; but otherwise it is only wiped with a cloth. A handful of salt is then put into it, and the edges of the vell are folded over and secured with a wooden skewer stuck through it. In this state it forms a ball of about three inches diameter, and is laid to soak twenty-four hours in a dish containing about a quart of clear whey, which has been boiled, and all the curd taken out. The next day the vell is well squeezed, and put into fresh whey; the first infusion being put into a proper vessel, the second is afterwards mixed with it and bottled for use. Half a pint of this liquor of a proper strength is sufficient to curdle forty gallons of milk. Experience alone enables the dairyman to judge of the strength of his rennet; for this purpose he takes in a flat ladle some milk which has been heated to about 95° of Fahrenheit and adds a small measure of rennet. By the rapidity with which it curdles, and the form of the flakes produced, he knows its exact strength, and puts more or less into the cauldron in which the milk is heated for curdling. A simple instrument might easily be invented, by which the exact degree of strength might be ascertained, and a rule given to guide the less experienced; but as long as a man feels a superiority acquired by experience alone, he is not likely to encourage any contrivance which would place others on a level with himself. From this cause even the thermometer has not been introduced generally into any great dairy, nor have any certain rules been given to ascertain the exact heat required in the milk, when the rennet is added, to form the best curd.

There are different kinds of cheese, according to the mode of preparing it: soft and rich cheeses are not intended to be kept long; hard and dry cheeses are adapted to be kept and stored for provisions. Of the first kind are all cream cheeses, and those soft cheeses, called Bath cheeses and Yorkshire cheeses, which are sold as soon as made, and if kept too long become soft and putrid. Stilton and Gruyere cheeses are intermediate; Parmesan, Dutch, Cheshire, Gloucestershire, and similar cheeses, are intended for longer keeping. The poorer the cheese is the longer it will keep; and all cheese that is well cleared from whey and sufficiently salted will keep for years. The small Dutch cheeses called Edam cheeses are admirably adapted for keeping, and form an important article in the victualling of ships.

The Gruyere and Parmesan cheeses only differ in the nature of the milk, and in the degree of heat given to the curd in different parts of the process. Gruyere cheese is entirely made from new milk, and Parmesan from skimmed milk. In the first nothing is added to give flavour; in the [illegible] saffron gives both colour and flavour: the process in both is exactly similar. A large cauldron in the shape of a bell, capable of holding from 60 to 120 gallons of milk, hangs from an iron crane over a hearth where a wood fire is made. The milk, having been strained, is put into this cauldron, and heated to nearly blood-heat (95° to 100°). It is then turned off the fire, and some rennet, prepared as stated above, is intimately mixed with the warm milk by stirring it with the hand, in which is held a flat wooden skimming-dish, which is turned round in the milk while the hand and arm stir it. A cloth is then laid over the cauldron, and in half an hour, more or less, the coagulum is formed. This is ascertained by pressing the skimming-dish on the surface, when the whey will appear on the part pressed. If it is longer than an hour in coagulating, the milk has been too cool, or the rennet not strong enough. The weather has a great influence on the process of the dairy, and there is much yet to be learned by accurate observations with meteorological instruments, especially electrometers. When the curd is properly formed, it is cut horizontally in thin slices by the same skimming-ladle. Each slice, as it is taken off, is poured along the side of the cauldron which is nearest to the operator; by this means every portion of the curd rises successively to the surface, and is sliced thin. The whole is then well stirred, and the cauldron is replaced over the fire. A long staff, with a small knob of hard wood at the end, and which has smaller cross pieces or sticks passed through holes in it at right angles to each other near the end, is now used to stir and break the curd, and the heat is raised to about 135°, which is as hot as the arm can well bear, even when used to it. The cauldron is again swung off the fire, and the curd is stirred with the staff, which is moved round with a regular rotatory motion, the knob running along the angle formed with the side by the bottom of the cauldron, which is in the form of a bowl. After stirring in this manner nearly an hour, the curd is found divided into small dies about the size of a pea, which feel elastic and rather tough under the finger. Experience alone can teach the exact feel they should have. The whey, of which a portion is removed occasionally, now floats at top, and the curd is collected in the bottom by giving a very rapid rotatory motion to the contents of the cauldron by means of the staff. A cloth is now introduced into the bottom, and all the curd collected over it; it is raised by the four corners, and laid on an instrument like a small ladder, which is placed across the mouth of the cauldron. The whey runs out through the cloth, which is a common cheese-cloth woven with wide [illegible] the curd in the cloth is placed in a shape or hoop [illegible] a slip of wood four inches and a half wide, the two ends of which lie over each other, so that the diameter can be increased or lessened. A cord fixed to one end of the hoop is passed with a loop over hooks on the outer surface of the other end, and prevents the ring from opening more than is required. The curd is pressed into this ring with the hands, and the ends of the cloth are folded over it. A round board, two inches thick, and strengthened by cross pieces nailed on it, is placed over the curd, and the press let down upon it.

The cheese-press is a simple long board or frame forming a lever, loaded at one end and moving in a frame at the other; it is lifted up by another lever connected with it, and let down on a strong stick, which stands with its end on the centre of the board last-mentioned. Thus the weight is easily removed or replaced. The hoop containing the cheese is placed on a similar board, and from it the table of the press slopes towards a wooden trough, which receives the whey as it runs out. In an hour after this, the curd is examined; the edges, which are pressed over the ring, are pared off, and the parings are put on the centre of the cheese; a fresh cloth is substituted, and the whole cheese is turned. The ring, which opens readily by unhooking the cord, allows the cheese to come out, and is put on again and tightened. This is repeated two or three times in the day. In the evening, a small portion of finely powdered salt is rubbed on each side of the cheese, and it remains in the press till the next morning. It is now again rubbed with salt, and placed on a shelf with a loose board under it. The wooden ring remains on the cheese for two or three days, and is then taken off. This is the whole process.

During the next six or eight weeks, the cheeses are turned and wiped every day, and a small quantity of fine salt is sifted on the surface and rubbed in with the hand until it will take no more. The cheese-room is always very

cool, and little light is admitted. A free circulation of air is essential. The cheeses are in perfection in about six months, and will keep two years. A quantity of elastic fluid is disengaged in the ripening, and forms those round eyes which are a peculiar feature in these cheeses. The smaller and rounder the eyes, the better the cheese is reckoned. They should contain a clear salt liquor, which is called the tears; when these dry up, the cheese loses its flavour. These particulars will give any one unacquainted with the dairy a tolerable notion of the process of cheese-making in general.

In Cheshire the making of cheese is carried on in great perfection, and the greatest pains are taken to extract every particle of whey. For this purpose, the curd is repeatedly broken and mixed, the cheeses are much pressed, and placed in wooden boxes which have holes bored into them. Through these holes sharp skewers are stuck into the cheese in every direction, so that no particle of whey can remain in the curd. The elastic matter formed also escapes through these channels, and the whole cheese is a solid mass without holes, which in this cheese would be looked upon as a great defect. The salt is intimately mixed with the curd, and not merely rubbed on the outside. This checks internal fermentation, and prevents the formation of elastic matter. The whole process of cheese-making is minutely described in the *Agricultural Report for Cheshire*.

Gloucester and Somersetshire cheeses are similarly made, with this difference, that the curd is not so often broken or the cheese skewered, and a portion of the cream is generally abstracted to make butter. After the curd has been separated from the whey and is broken fine, warm water is poured over it for the purpose of washing out any remaining whey, or perhaps to dissolve any portion of butter which may have separated before the rennet had coagulated the milk; for although cream adds to the richness of cheese, butter tends to make it rancid.

Stilton cheese is made by adding the cream of the preceding evening's milk to the morning's milking. The cream should be intimately incorporated with the new milk; great attention should be paid to the temperature of both, and much of the quality of the cheese depends on this part of the process. To make this cheese in perfection, as much depends on the management of the cheese after it is made as on the richness of the milk. Each dairy-woman has some peculiar method which she considers as the best; and it is certain that there is the greatest difference between cheeses made in contiguous dairies. The rennet should be very pure and sweet. When the milk is coagulated, the whole curd is taken out, drained on a sieve, and very moderately pressed. It is then put into a shape in the form of a cylinder, eight or nine inches in diameter, the axis of which is longer than the diameter of the base. When it is sufficiently firm, a cloth or tape is wound round it to prevent its breaking, and it is set on a shelf. It is occasionally powdered with flour, and plunged into hot water. This hardens the outer coat and favours the internal fermentation, which ripens it. Stilton cheese is generally preferred when a green mould appears in its texture. To accelerate this, pieces of a mouldy cheese are sometimes inserted into holes made for the purpose by the scoop, called a *taster*, and wine or ale is poured over for the same purpose; but the best cheeses do not require this, and are in perfection when the inside becomes soft like butter, without any appearance of mouldiness. In making very rich cheeses the whey must be allowed to run off slowly, because, if it were forced rapidly, it might carry off a great portion of the fat of the cheese. This happens more or less in every mode of making cheese. To collect this superabundant butter, the whey is set in shallow pans, as is done with milk when butter is made; and an inferior kind of butter called *whey butter* is made from the cream or fat skimmed off.

Cheeses are frequently coloured, a practice which probably arose from the notion of making the cheese look richer; but now it deceives no one. Yet if some cheeses were not coloured, they would not be so marketable, owing to the association that subsists between the colour and the quality of the cheese. The substance used for colouring is most commonly arnotto. [ARNOTTO.] It is ground fine on a stone, and mixed with the milk at the time the rennet is put in. The juice of the orange carrot, and the flower of marygold, are also used for this purpose. This last give a more natural tint than the arnotto, which is too red. Cheddar, a cheese made in Somersetshire, which is highly prized, Stilton, Derby, and some other cheeses, are never coloured: Cheshire slightly; but Gloucester and North Wiltshire deeply. Foreign cheeses are only coloured very slightly, if at all: the Dutch cheeses are made in a very similar manner to the Gloucester cheeses, but the milk is generally curdled by means of muriatic acid or spirits of salt: and great care is taken to prevent fermentation, and to extract the whole of the whey. For this purpose the curd is repeatedly broken and pressed; and before it is made up into the round shape in which it is usually sold, the broken curd is well soaked in a strong solution of common salt in water. This diffuses the salt throughout the whole mass, and effectually checks fermentation. When the cheeses are finally pressed, all the whey which may remain is washed out with the brine; salt is likewise rubbed over the outside, and they are set to dry on shelves in a cool place. The flavour of the cheese is perhaps impaired by the stoppage of the fermentation; but it never heaves, and it acquires the valuable quality of keeping well even in warm climates. From the place where this cheese is commonly made, it is known by the name of Edam cheese. A finer cheese is made at Gouda and other places, by imitating the process in making Gruyere cheese; but this cheese is always full of small cavities, and will not keep so long as the Edam. The cheese most commonly met with in Holland is a large kind of skim-milk cheese, which is made very like Cheshire cheese. It grows hard and dry, and has not much flavour. To supply this defect, cummin seeds are mixed with the curd, which those who are accustomed to it consider a great improvement. On the whole it is a better cheese than our Suffolk skim-milk cheese, and forms an important part of the provisions usually stored for a Dutch family. In France the Roquefort cheese is compared to our Stilton, but is much inferior, although a good cheese. The little cheeses made from cream and folded in paper, called Neufchâtel cheeses, are imported from France as a delicacy. They can be easily imitated, being nothing more than cream thickened by heat, and pressed in a small mould. They undergo a rapid change, first becoming sour and then mellow, in which state they must be eaten.

A small cheese, much relished by all ranks, is made in the north of Germany in the simplest manner. It is usually made from milk from which the cream has been taken off to make butter,—although the entire milk is much better. This is curdled by being placed near a fire. When it has become somewhat sour, it is put into a linen bag, and all the whey well pressed out. When it is tolerably solid, it is broken by the hand in a tub, and made very fine. It remains in this state several days, until a considerable alteration takes place, and the putrid fermentation begins, as is readily perceived by the odour. It is then taken in small portions, and formed into flattened balls three or four inches in diameter, by beating them in the hands. These balls are ranged on a board, and set to dry. A portion of carraway seed is generally mixed with the curd. In a few days the mellowing goes on, and the centre becomes very soft. In this state it is a great dainty for those who disregard a pungent and fetid smell. They are sometimes placed in the smoke of a chimney where the putrid fermentation is checked and confined to the centre by the pyroligneous acid arising from a wood fire. They remain in the chimney a considerable time; and when they are used the outer part is peeled off like the rind of an apple. A whole cheese is a mere mouthful. It gives a relish to the sour black rye bread generally eaten by the lower orders.

The green Swiss cheese, commonly called *Schabzieger*, which is made in the canton of Glarus, and is by many persons highly esteemed, is made somewhat in the same manner. The curd is pressed in boxes with holes to let the whey run out; and when a considerable quantity has been collected and putrefaction begins, it is worked into a paste with a large proportion of a certain dried herb reduced to powder. This herb, called in the country dialect *Zieger kraut* (curd-herb), is the *Melilotus officinalis*, which is very common in most countries, and has a peculiar aromatic flavour in the mountains of Switzerland. The paste thus produced is pressed into moulds of the shape of a common flower-pot, and the putrefaction being stopped by the aromatic herb, it dries into a solid mass, which keeps unchanged for any length of time. When used it is rasped

or scraped, and the powder mixed with fresh butter is spread upon bread. It is either much relished or much disliked, like all those substances which have a peculiar taste and smell.

A species of cheese or rather hard curd is made in the mountains of Switzerland from the whey which has run from the common cheese made of the whole milk. It is called *serré*. When the Gruyere or the Jura cheese, which is often sold by the same name, has been put under the press, a quantity of fermented whey, about two or three gallons, is poured into the cauldron with the new whey, and the whole is heated over the fire till a thick scum rises. This is taken off when the whey is nearly boiling, and put into a square box with holes in it; the whey which remained mixed with the curd, and which is now very blue, is allowed to run out, and a small pressure assists it. When a cheese of sixty pounds has been made, the serré will often weigh twenty pounds. This mass of curd readily dries on the shelf, and becomes hard. It has little flavour, but it serves the people on the mountains for bread. They cut slices of it, spread some butter over, and put a thin slice of cheese upon this: washed down with a cup of fresh or of fermented whey, it forms the chief food of the mountain herdsmen. The only luxury indulged in is an occasional glass of *kirsch-wasser*, a spirit distilled from cherries, or of gentian brandy, from the root of the *Gentiana officinalis*.

When a cheese which has been much salted and kept very dry is washed several times in soft water, and then laid in a cloth moistened with wine or vinegar, it gradually loses its saltness, and from being hard and dry, becomes soft and mellow, provided it be a rich cheese. This simple method of improving cheese is worth knowing. It is generally practised in Switzerland, where cheeses are kept stored for many years, and if they were not very salt and dry they would soon be the prey of worms and mites. A dry Stilton cheese may thus be much improved.

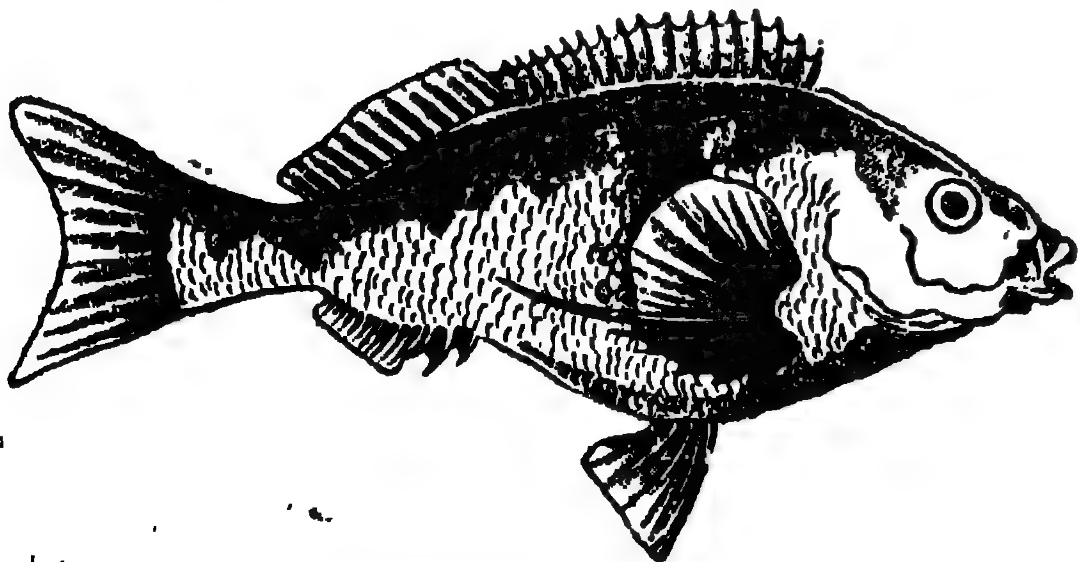
The cheese trade is one of considerable importance.

CHEESE-RENNET, a wild flower with square stems, shining whorled leaves, and loose panicles of small yellow flowers. It is the *Galium verum* of botanists, and derives its popular name from having been formerly employed to curdle milk.

CHEILI'NUS. [LABROIDES.]

CHEILODA'CTYLUS, a genus of fishes, of the section *Acanthopterygii*, and family *Sciænoïdes*. Characters:—mouth small; dorsal fin with numerous spiny rays; lower rays of the pectoral fins simple and continued beyond the membrane.

Cheilodactylus monodactylus (*Chætodon monodactylus*, Carmichael; *Linn. Transactions*, vol. xii.), will serve to illustrate this genus. This fish is about eighteen inches in length; the body is somewhat oval and compressed; the teeth are small and crowded; the pectoral fin is large, and has fifteen rays, the six lower of which are simple and protrude beyond the membrane; the sixth ray from the bottom is very much elongated. The colour is olive, or bronze, with six dark stripes on the back: the fins are blackish, with the exception of the pectorals, which are amber-coloured.



[Cheilodactylus monodactylus.]

This species is very common on the coast of the small island of Tristan da Cunha, and feeds upon the *fucus pyriferus*.

CHEILODI'PTERUS (Lacépède), a genus of fishes of the section *Acanthopterygii*, and family *Percidæ*. Technical characters:—Body rather short; pre-operculum double-edged, the edges finely serrated; scales large, easily dislodged, continued on to the pre-operculum; the two dorsal fins widely separated.

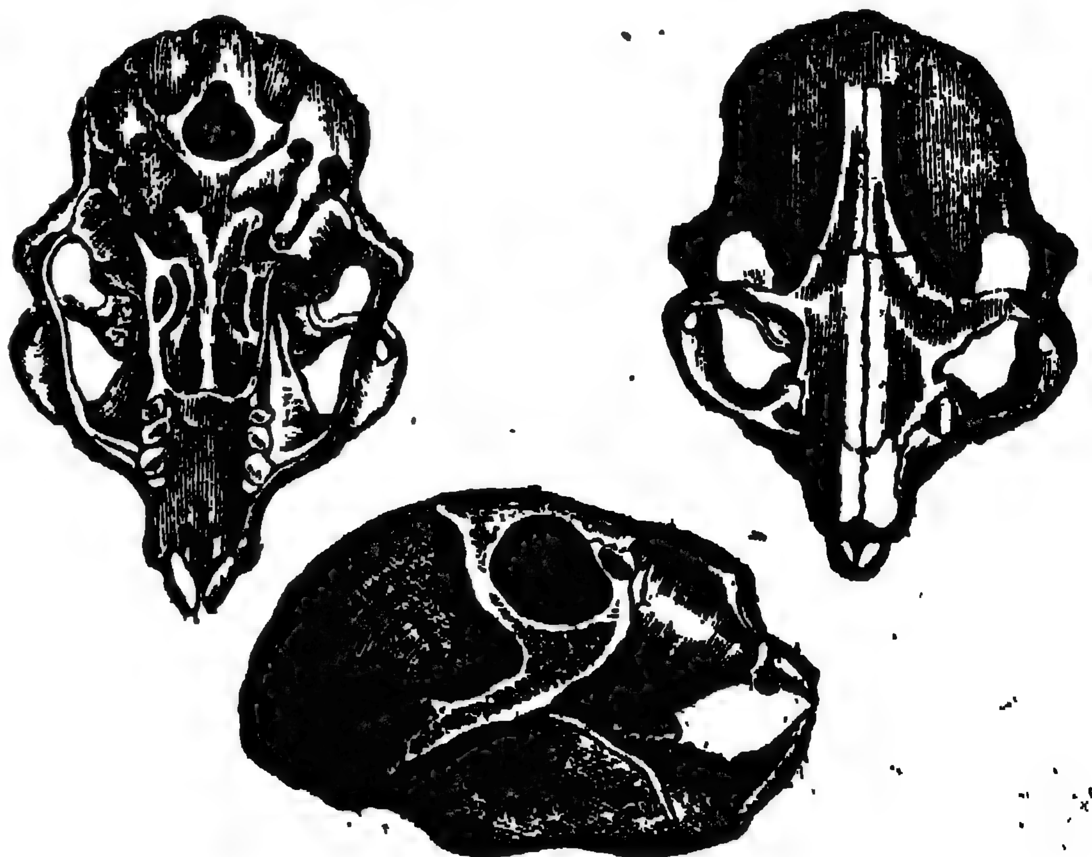
The characters here detailed are those of the genus Apogon, from which the present genus differs chiefly in having the jaws furnished with long and pointed teeth. But three species of Cheilodipterus are known; they are all of small size, and furnished with slender longitudinal stripes. *C. octo-vittatus*, as its name implies, has eight stripes. *C. quinquelineatus* has five longitudinal black stripes, the ground colour of the body being silvery white: it is about four inches in length, and comes from the Society Islands. The third species, *C. Arabicus*, is of an olive green colour above, and has the under parts silvery with a pinkish hue; this species has from fourteen to seventeen longitudinal stripes.

As an example of the genus Apogon, of which there are several species, we may notice the Apogon, *Rex Mullorum*, or Roi des Rougets (Cuvier): this species rarely exceeds six inches in length, and is of a beautiful red colour with three large black spots on the back; one under each of the dorsal fins, and one towards the tail; the whole surface is also sprinkled with small black dots. The remaining species are also small, and most of them are of a red colour; a few have been found off the coast of New Holland, but most of them frequent the Indian seas.

CHEIROGA'LEUS. [LEMURIDÆ.]

CHEIRO'MELES. [CHEIROPTERA.]

CHEI'ROMYS (Zoology), the scientific name for the Aye-Aye, a singular quadruped (which must not be confounded with the Ai, or Sloth [AI], from which it very strongly differs in organization, though its habits are lazy), discovered by Sonnerat at Madagascar, and described by him in the second volume of his 'Voyage aux Indes,' under the name of Aye-Aye, which, it appears, is an exclamation of the natives; and it is conjectured that the name was attached to the animal in consequence of a supposed resemblance to its cry. Sonnini, who formed the genus, observing that it is the only species known, censures Gmelin with some reason for denominating it *Sciurus Madagascariensis* (Madagascar Squirrel), because a quadruped of the latter genus really exists in Madagascar. Cuvier places the form next to the Flying Squirrels, *Polatouches* (*Pteromys*), and immediately before the Rats (*Mus*, Linn.), remarking that the lower incisors are much more compressed, and especially more extended from before backwards, than those of the squirrels, and resemble ploughshares (socs de charrue). The feet, he adds, have all five toes, of which four of those on each anterior extremity are elongated, the middle too being much more slender than the others; in the hind feet, the great toe is opposable to the others, so that in this respect the animal is among the Rodents what the Opossums (Sarigues) are among the Carnassiers. The structure of the head, he continues, is very different from that of the



[Skull of Aye-Aye.

other Rodents, and has more relation to the Quadrumana.

Dental formula: incisors, $\frac{2}{2}$; molars, $\frac{4-4}{3-3} = 18$.

Sonnerat says that the Aye-Aye, which is found chiefly if not exclusively on the western part of the island, does not approach any genus, but that it leans towards the Maki, the Squirrel, and the Ape. Its large and flat ears, he observes, resemble much those of a bat; and states that its principal character, and a very singular one it is, is the middle toe or finger of the fore foot, the two last joints of which are

very long, slender, and denuded of hair. This memoer, he adds, is useful to it in drawing worms out of holes in the trees, and that it seems also to be of service in holding on to the branches of trees. He says that it appears to be a subterranean animal, and does not see during the day, and that its eye resembles in colour that of the owl. He describes it as being very slothful, but good tempered, remaining always at rest and requiring a good deal of shaking to make it move. The subject of his observations lived two months upon no other nourishment than cooked rice, and it fed itself with its two fingers like the Chinese with their chopsticks. All the time M. Sonnerat had this animal alive, he never saw it carry its tail elevated like the squirrel. It always dragged. But Buffon's figure, or rather that of the *Supplement*, sets the tail up, notwithstanding the observation in the text.

Buffon (*Supplement*) states, that he examined the skin of one which Sonnerat gave to the Cabinet du Roi, and that it appeared to him to approach the squirrels more than any other race; and also to bear some relation to the Tarsier. The length of the animal, measured in a straight line from the tip of the muzzle to the insertion of the tail, was one foot, two inches, two lines (French), and following the curvature of the body, one foot six inches and six lines, and the length of the stump of the tail was one foot three inches. In the anterior extremities, the length of the internal finger, which acts in some measure as a thumb, was one foot one line, and the nail six lines; the next finger, or first finger, two inches nine lines, and the nail six lines; the second, which is much more delicate and slender, being only one line in thickness, was two inches and seven lines long, and the nail three lines. The third finger was three inches, two lines in length, and the nail six lines. The fourth finger was one inch, nine lines, and the nail six lines. The hind feet to the extremity of the fingers were three inches and two lines long. This was a female.

Buffon describes the colour as a musk brown mixed with black and grey-ash. On the head, round the eyes, on the body, thighs and legs, the colour was deep musk, in which, nevertheless, black predominated upon the back and many parts of the body and legs. The tail was entirely black; the sides of the head, the necks, the jaw, and the belly were greyish. There were woolly hairs of this grey colour below the great black or white hairs, of two or three inches long, which were on the body and legs; but the legs and thighs were of a reddish brown. Black predominated at the approach of the feet, which were covered with small hairs of that colour. The head was like that of a squirrel, and the ears large, naked, erect, and round at their extremities, with a wide opening.



[Cheiromys Madagascariensis.]

This animal is the *Aye-Aye Squirrel* of Pennant. Shaw considered it to be a species of *Lemur*, and Schreber named it *Lemur psilodactylus*, a name adopted by Shaw. Our figure is reduced from that given by Sonnerat.

CHEIRONECTES, or CHIRONECTES (Mammalogy), Illiger's name for a genus of Marsupial animals. [DIDELPHIDÆ.*]

CHEIRO'PODA†, CHEIROPEDS, a name proposed by Mr. Ogilby for all the mammiferous animals that are possessed of hands. The following is an abstract of Mr. Ogilby's arrangement of his Cheiropeds.

Class - - Mammalia.
Order - - Cheiropoda.

Mammals with opposable thumbs on the anterior extremities only - - - - Bimana.
On both anterior and posterior extremities, Quadrumana.
And with anthropoid teeth.
Monkeys of the Old World.
——— abnormal teeth,
Lemuridæ.
On the posterior extremities only - - Pedimana.
And with anthropoid teeth,
Monkeys of the New World.
——— rodent teeth,
Cheiromys.
——— abnormal teeth,
Didelphidæ.

Observations, commenced in 1829 and continued for more than six years, have assured this zoologist that the non-opposable character of the inner finger of the anterior extremities, which he first remarked in *Mycetes Seniculus*, is not confined to that genus, but extends throughout the whole of the genera of the South American monkeys, individuals of all of which have, he states, been seen by him in a living state. In none of them, consequently, he observes, does a true thumb exist on the anterior limbs; and he considers that it follows as a further consequence that the whole of them have been hitherto incorrectly referred to the *Quadrumana* by zoologists generally. He speaks of D'Azara's remark, that the anterior extremities of some of the species observed by him had five fingers, originating on the same line with each other, as a solitary exception, and as having been either unnoticed by other authors, or to have been considered as unworthy of attention, so entirely were they at variance with the preconceived notions of all.

As Mr. Ogilby's views on this subject differ from those of other zoologists, and appear to be the result of much attentive examination, principally made on the living animals, we proceed to give the substance of his 'observations on the opposable power of the thumb in certain *mammals*, considered as a zoological character; and on the natural affinities which subsist between the *Bimana*, *Quadrumana*, and *Pedimana*,' as set forth in the abstract of that paper in the 'Proceedings of the Zoological Society of London,' read on the 8th of March, 1836.

'Of the eight natural genera which include all the known monkeys of the western hemisphere, one, *Ateles*, is entirely destitute of a thumb, or has that member existing only in a rudimentary form beneath the skin. In five others, *Mycetes*, *Lagothrix*, *Aotus*, *Pithecia*, and *Hapale*, the anterior thumbs (using the ordinary expression for them) are placed absolutely on the same line with the other fingers, are of the same form with them, act invariably in the same direction, and are totally incapable of being opposed to them. In the two remaining genera, *Cebus* and *Callithrix*, the extremities of the anterior limbs have a greater external resemblance to the hands of man and of the monkeys of the Old World: the internal finger is placed further back than the general line of the other fingers, and has, on that account, when superficially noticed, the semblance of being opposed to them; but, as has been correctly observed by D'Azara, with reference to *Cal. capucinus*, it is less separated than in *man*: it is, besides, of precisely the same slender form with the rest, is weaker than them, absolutely without power of opposition to them, and habitually acts in the same direction with them. The impression derived from contemplating the hands of the Old World monkeys might induce the belief that the extremities of the *Cebi* are

* N.B. *Chironectes* (Ichthyology) is the name adopted by Cuvier for a genus of Acanthopterygians (*Antennarius* of Commerson), comprising some of those fishes popularly known under the name of *Anglers*. This may be the source of confusion both to the hearer and the reader, and the name of the latest date should be changed.

† Χείρ, a hand; πούς, a foot.

similarly constituted; but if the knowledge that in *Mycetes*, *Pithecia*, &c., there are no opposable thumbs, leads to a close observation of the anterior extremities of the *Cebi*, it will be found that they do not act as hands, and cannot be considered as possessing the powers of those organs. From innumerable observations of many species of that genus, Mr. Ogilby states that it was very evident, notwithstanding the fallacious appearance occasioned by the backward position of the organ, that they had not the power of opposing the thumbs to the other fingers in the act of prehension; and, in fact, their principal power of prehension seems to be altogether independent of the thumb, for, generally speaking, that member was not brought into action at all, at least not simultaneously with the other fingers, but hung loosely on one side, as Mr. Ogilby has seen it do, in like circumstances, in the *Opossums*, *Phalangers*, and other arboreal *Mammals*: when actually brought into play, however, the thumb of the *Cebi* invariably acted in the same direction as the other fingers. *Cebus* consequently agrees in the character of non-opposableness of thumb with the nearly allied genera. And in this hitherto unsuspected peculiarity zoologists obtain a far more important character by which to distinguish the monkeys of the Old and New World than that hitherto relied on, the comparative thickness of the *septum narium*, or than the accessory aids afforded by the absence of cheek-pouches and callosities. Hence, according to Mr. Ogilby, as the monkeys of America have now been ascertained to be destitute of anterior hands, they can be no longer included among the *Quadrumana*; and he proposes, in consequence, to regard them as *Pedimana*. He considers that the latter series, the monkeys of America, form a group parallel to that of the monkeys of the Old World among the *Quadrumana*: and viewing the *Quadrumana* as consisting of two primary groups, that of which *Simia* forms the type, and the *Lemuridæ*, he proceeds to analyze the *Pedimana*, in order to determine whether any group analogous to the *Lemurs* exists in it. He finds such a group in the association of the genera *Didelphis*, *Cheironectes*, *Phalangista*, *Petaurus*, and *Phascolarctos* (together with a new genus, *Pseudochirus*, which he has found it necessary to separate from *Phalangista* as at present constituted): and for this association he uses the name of *Didelphidæ*. Aware that the modifications observable in the dentary systems of these several genera have been regarded by many zoologists as betokening a difference of regimen, which has led to their being viewed as constituting distinct families, he, in the first place, states, as the result of his observation of the habits of the numerous species of all these genera which have been, from time to time, exhibited in the Society's gardens, that there is little or no difference, in this respect, between the *Opossums* and *Phalangers*, but that all are equally omnivorous; and then proceeds to discuss the modifications that exist among them in the number and form of the several kinds of teeth, which are not, in his estimation, so very different in reality between the *Opossums* and *Phalangers* as they appear to be at first sight. In further support of his opinion that this association of genera forms a natural family, Mr. Ogilby refers to the gradual and uninterrupted transition from the naked-prehensile-tailed *Opossums* of South America, through the equally naked-tailed *Couscous*, *Balantia*, of the Indian Isles, to the true *Phalangers*; and from these to the *Petaurists* directly on the one hand, and, by means of the *Pseudocheirs*, to the *Koalas* on the other.

'On the prehensile power of the tail Mr. Ogilby particularly insists, as on a faculty possessed by the greater number of the *Pedimana*, and as one which is, in truth, almost confined to them; only three known genera belonging to other groups, *Synetherus*, *Myrmecophaga*, and *Cercoleptes*, being endowed with it. He remarks on this faculty as on one of considerable importance, affording as it does, in some degree, a compensation for the absence of opposable thumbs on the anterior limbs. Combined with the prehensile tail, in every known instance, whether among the *Pedimana* or in other groups, is a slowness and apparent cautiousness of motion, not observable in any of the *Quadrumana*, except in the *Nycticebi*. In none of the true *Quadrumana* is the tail prehensile.

'Another evidence of the distinctness, as two groups, of the *Quadrumana* and the *Pedimana*, is furnished by their geographical distribution. The *Quadrumana* are strictly confined to the limits of the Old World; the *Pedimana* almost as exclusively to the New World; for Mr. Ogilby considers the continent of Australia to belong more properly to America than to Asia. The very few apparent exceptions that occur to this latter position are in the presence of some species of *Phalangers* in the long chain of islands that connect the south-eastern shores of Asia with the north-eastern coast of Australia; islands which may, in truth, be fairly regarded as belonging partly to the one and partly to the other, and the productions of which might consequently be expected to partake of the character of both.

'Mr. Ogilby subsequently adverts to another *Pedimanous* animal, the *Aye-Aye* of Madagascar, constituting the genus *Cheiromys*; respecting the affinities of which he speaks with hesitation, because, having never had an opportunity of examining the animal itself, he is acquainted with its characters only at second hand. He is, however, disposed to regard it as representing a third group among the *Pedimana*, to be placed in a station intermediate between the *Monkeys* of the New World and the *Didelphidæ*. With the latter he would, in fact, be disposed to associate it, were it not destitute of the marsupial character which belongs to all the other animals comprised in that group. In some of the *Didelphidæ*, the *Phalangers* and *Petaurists* especially, there is a marked approximation to that rodent form of incisor teeth which obtains in *Cheiromys*, and which has hitherto been regarded as especially attaching to it an abnormal character.

'*Man* is the only other animal furnished with hands, and however distinct he may be as regards his moral and intellectual powers, he must, zoologically, be considered on physical grounds. By his structural characters he becomes associated with all those of which mention has previously been made in Mr. Ogilby's communication; although he unquestionably constitutes among them a peculiar group, sensibly exalted above the rest, as well as above all other *Mammals*.'

CHEIROPTERA * (Zoology), the name of a natural family or division of mammiferous animals; the *Bats* or *Flittermice*, of the English; *Fledermäuser* of the Germans; *Vespertiliones* of the Latins; *Pipistrelli* and *Nottoli* of the Italians; *Chauve-souris* of the French: for we agree with those zoologists who are of opinion that *Galeopithecus*, which, taking its organization and habits into consideration, can hardly be called a bat, should be rather referred to the *Lemuridæ* than to this family, though its place among created beings is, as yet, hardly agreed on. [Galeopithecus.]

The animals then which we consider to belong to this wing-handed family are those which would come under the genus *Vespertilio* of Linnæus. They all have the faculty of sustained flight, and their organization and habits point them out as a separate and well-defined group, distinguished by a folding extension of the membranous skin, which, rising from the sides of the neck, is spread between their fore-feet and their fingers.

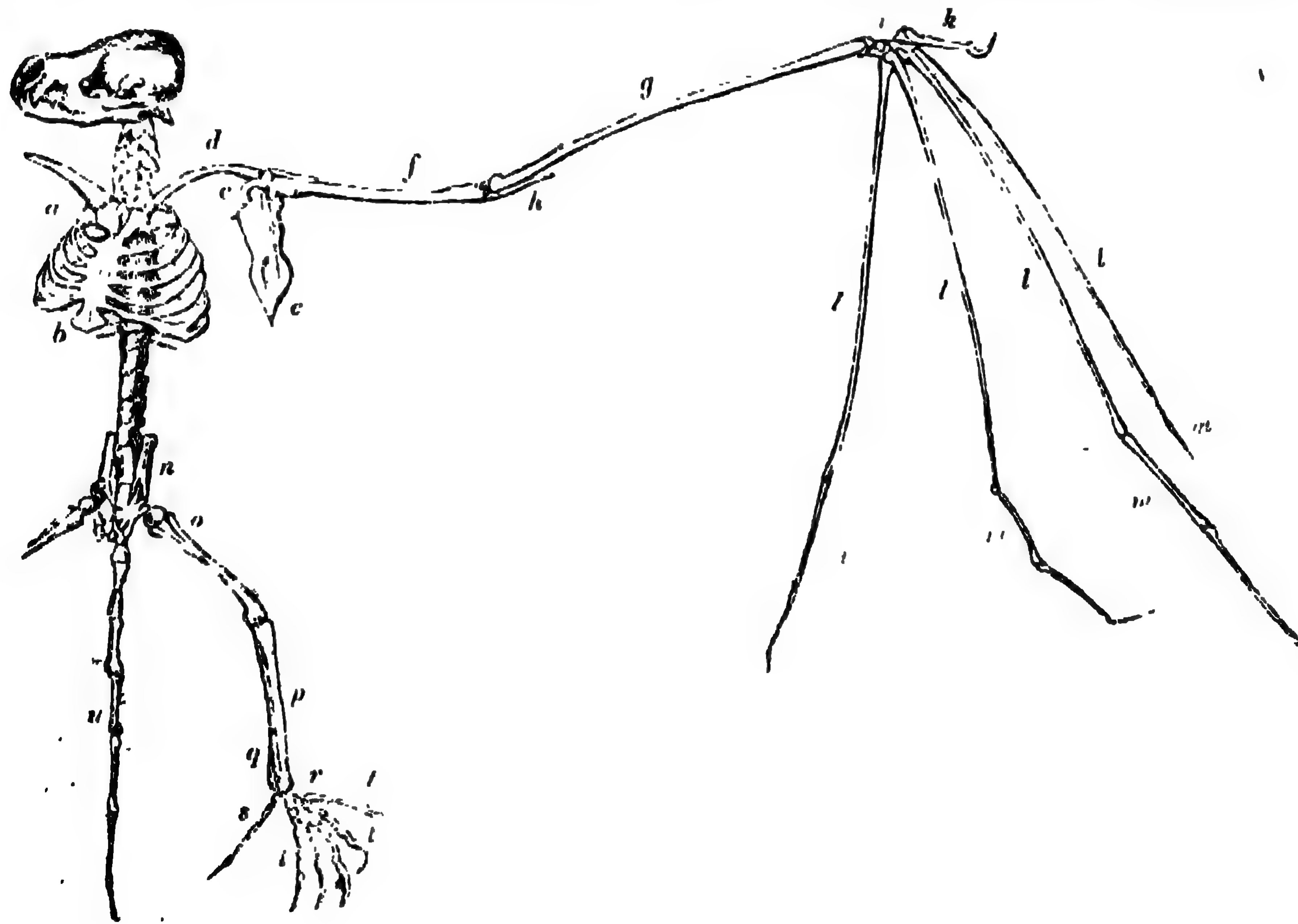
Organization.

Skeleton. The skull is thin, and there is a marked difference between that of the so called frugivorous group (*Pteropus* and *Cephalotes*) and the true or insectivorous Bats, *Vespertilionidæ* of Gray, the former being much more elongated than the latter. The bony *tentorium*, so strongly developed in the majority of the carnivora, is entirely absent; but there is a considerable development of the auditory portion of the temporal bone. The occipital bone is remarkably narrow. The superior maxillary is very much elongated, particularly in the so called frugivorous order, a term which we would change for omnivorous, for their well developed sharp canines, and the structure of some of their other teeth, would seem to be more trenchant than fruit-eating habits alone would require; and indeed Cuvier, in the last edition of the 'Règne Animal,' says of the genus *Pteropus*, 'they live principally on fruit, of which they destroy a great deal; but they know, nevertheless, how to pursue birds and small quadrupeds,' and we think it highly probable that they occasionally prey on the large insects which are found in the climates they inhabit. All the family have four great canine teeth, but there is considerable difference between the molars of the fruit-eating section and of that whose diet is confined entirely to insects, the crowns of the former being comparatively blunt and hollowed out or grooved lengthwise, while those of the latter are shorter and sharper, and beset with points. The molars

* χεὶρ, a hand, and πτερὸν, a wing.

vary in number in the different genera, the smallest development being three in each jaw, and the largest five above and six below, or *vice versâ*. The incisors set in the small and short intermaxillary bones vary also in the different genera. The smallest number in the upper jaw is two, and the largest four; the smallest number is also two in the lower jaw, and the largest six. The *atlas* is of considerable size, but the *dentata* is not large. The greatest number of the *dorsal vertebræ* is twelve, the smallest eleven. The canal for the spinal chord is large in these vertebræ. The *lumbar vertebræ* vary in number; the smallest number is four, the largest seven. The *ossa coccygis* are slender and elongated: their use seems only to be to assist (somewhat like a spreat) in spreading the interfemoral portion of the membranes, by the aid of which the animal sails in the air: their smallest number is six, and their largest twelve; for in the majority the tail extends to the margin of the membrane, while in some it protrudes beyond it, and in others it does not reach more than half way. In *Pteropus* there is no trace of these bones.

The *ribs* are remarkably long, except the first pair, which is very short, and remarkably broad, especially in the cartilage, which is ossified; and the *sternum* is highly developed, as might be expected from the exigencies of the animal. The anterior portion is expanded laterally into what is termed the *manubrium*, which seems to be largest in the *Horse-shoe Bat* (*Rhinolophus*), forming a suitable point of attachment for the strong, long, arched clavicles, which are articulated both to the *sternum* and *scapula*: the latter is very large and elongated, and the lower surface is very concave. The *fossæ* for the strong muscles, both above and below the spine of this bone, are deeply marked. The habits of the animal required an ample development of these parts to give the shoulder the required solidity for working the mechanism of the wing, and we accordingly find the strength thrown into the *sternum, clavicles*, and *scapula*. But these same habits would have rendered the rotatory motion of the fore-arm worse than useless, for such a disposition would have weakened the power of the limb in beating the air with the extended membrane. We accordingly find that this power is absent: the *ulna*, indeed, is remarkably small, and in some the bone is merely rudimentary, forming a mere flat process, only partially separated from the *radius*: there is no *olecranon* (elbow) The *humerus* is long, slender, and cylindrical, and the head of the bone large and round. The structure of the *wrist* is peculiar: first come two bones next to the *radius*, and on these that bone rests; one of these is very large, and the other very small—the second series consists of the usual four bones; but it is in the bones of the *metacarpus* and of the fingers that the adaptation of the osseous parts of the animal to its necessities is, perhaps, most strongly shown. These, with the exception of the phalanges of the thumb, are greatly elongated, and run outwards and downwards to the edge of the wing-membrane, something after the fashion of the whalebones that assist in spreading an umbrella. The first finger is the shortest, and extends to the upper angle of the outer edge of the membrane; the second is generally the longest, and the third and fourth nearly of a length; the three last descend to the lower edge of the membrane. The *pelvis* is straight and lengthened, and rather wider below than it is above, the *ilia* being very narrow and elongated. The *ossa ischii* approach even to the contact of their tuberosities, and in some examples touch the *ossa coccygis*. The *ossa pubis*, in some species, recede from each other, the intermediate space being filled by a ligament; and in others these bones touch each other in the male, and are separated in the female. The *sacrum*



[Vespertilio murinus. Skeleton of Bat.]

a, manubrial bone; *b*, xiphoid cartilage; *c*, coracoid bone; *d*, clavicle; *e*, shoulder blade; *f*, humerus; *g*, radius; *h*, rudiment of ulna; *i*, carpus (wrist); *k*, metacarpus of thumb, terminated by a hook-shaped phalanx; *l*, metacarpal bones of the fingers; *m*, digital phalanges; *n*, pelvis; *o*, femur; *p*, tibia; *q*, fibula; *r*, tarsal bones of foot; *s*, styliform appendage to os calcis; *t*, metatarsus and toes; *u*, tail.

and *ilia* are anchylosed early in life. The lower extremities do not offer any very striking differences from those of other mammifers, excepting that the thighs being directed outwards, the bones of the leg are partially turned round as it were (the *fibula* appearing at the inner side of the *tibia*, and a little posterior to that bone), and that there is a singularity about the heel. An elongated delicate bony process is given off from the back part of the foot, is inclosed in the margin of the interfemoral membrane, and proceeds about half way to the tail. Cuvier thought this a portion of the *os calcis*; Daubenton, that it was a distinct bone; and Meckel, that it is only a development of the tuberosity of the bone, disunited from its body. Mr. Daniell, on the 11th November, 1834, exhibited to the Zoological Society of London skeletons of the male and female *Pipistrelle* and *Noctule Bats*, for the purpose of pointing out a peculiarity in the female, connected, as he conceives, with the mode of parturition, described under the head of '*Habits*'. This peculiarity consists of a prolongation of the *os calcis* along the margin of the membrane, extended between the hinder extremities and the tail, of much greater length and strength in the female than in the male. By means of this process, Mr. Daniell believes the female to be capable of giving greater tension to the pouch formed of that membrane for the reception of the young in the act of parturition.

Digestive Organs. Besides the difference of the molar teeth in the fruit-eating (or omnivorous) and the insectivorous Bats, already alluded to, the stomach and intestines present a remarkable corresponding variance. The stomach of the former is very complicated, and the intestines very long: in *Pteropus*, for example, they are seven times as long

as the body. In the latter the stomach is very simple, and merely divided into the cardiac and pyloric portions, and the intestines are not more than twice the length of the body. These differences, together with that of the greater or less development of the tail, which is powerful, generally speaking, in the true insectivorous bats, and either absent, rudimentary, or comparatively inefficient in the fruit-eaters, which last do not require to turn so rapidly as the desultory flight of the prey of the former makes it necessary for them to do, form, it is true, a marked distinction between the two groups; but we are, notwithstanding, of opinion that very few Bats confine themselves entirely to a vegetable diet.

Nervous System and Senses. Taste.—This sense is probably well developed. In *Pteropus* the surface is rough. In *Phyllostoma* there is a peculiar structure, the tongue being suctorial by the aid of several wart-like elevations, capable of forming a disk for extracting the juices of fruits or the blood of animals through the operation of muscular fibres acting on these wart-like elevations by a tendon transmitted to each. *Smell*, most probably acute, especially in the *Rhinolophinæ*. *Sight and Hearing.*—The eye is diminutive in the Insectivorous Bats, and of fair proportion in the other section; but this is compensated for in the former by the extraordinary development of the external and part of the internal *auditory apparatus*, while that of the latter offers nothing remarkable. The external ear of the British long-eared bat (*Plecotus auritus*) almost equals the body in length. *Touch.*—This, or a sense analogous to it, must be highly developed. Spallanzani—we cannot compliment him on his humanity—extracted the eyes of bats and covered the empty sockets with leather; yet, in this condition, they flew round his room, avoiding the sides, never striking against anything, and flying out of the door without touching the door-case. In flying through a sewer which made a right angle, they turned at the proper point, though at a distance of two feet from the walls. They found their resting-place on a cornice, and flew through threads, suspended perpendicularly from the ceiling, without touching them, though scarcely farther apart than would admit their extended wings; and they avoided all obstacles with equal facility when the whole head was covered with varnish. But, according to the experiments of Carlisle, the British long-eared bat was entirely at a loss if, when blinded, its ears were stopped,* for in that condition the blinded bats struck against the sides of the room, and seemed to be quite unaware of their situation. The following additional note to the English translation of Blumenbach, however, corroborates Spallanzani. 'Bats have been supposed to possess a peculiar power of perceiving external objects, without coming actually into contact with them. In their rapid and irregular flight, amidst various surrounding bodies, they never fly against them; yet it does not seem that the senses of hearing, seeing, or smelling, serve them on these occasions, for they avoid any obstacles with equal certainty when the ear, eye, and nose, are closed. Hence naturalists have ascribed a sixth sense to these animals; it is probably analogous to that of touch. The nerves of the wing are large and numerous, and distributed in a minute plexus between the integuments. The impulse of the air against this part may probably be so modified by the objects near which the animal passes, as to indicate their situation and nature.' Cuvier, in his *Leçons d'Anatomie Comparée*, had, in a great measure, solved the mystery by observing, as is remarked in the note just quoted, that the whole surface of the flying membrane, on both sides, is endowed with extraordinary sensibility, and may be considered as one continuously expanded organ of touch. Nor is this the only peculiarity connected with the integument of the bats, for, in the genus *Nycteris* there exists a power of inflation to such a degree, that when the faculty is exerted the animal looks, according to Geoffroy, like a little balloon fitted with wings, a head and feet. The subcutaneous tissue is the part inflated, and as the skin adheres to the body at particular points only, the connexion being by means of loose cellular membrane, spaces are left which can be filled with air at the will of the *Nycteris*, through the cheek pouches, which are perforated at the bottom so as to communicate with those spaces. When the *Nycteris* wishes to inflate its skin, it draws in its breath, closes its nostrils, and transmits the air through the perforations of the cheek pouches to the subcutaneous spaces, and the air is prevented from returning by the action of a sphincter, which closes those openings, and by valves of considerable size on the neck and back.

* Shaw says that, from Mr. Jurine's anatomical observations on these animals, it appears that a very large proportion of nerves is expanded on the upper jaw, the muzzle, and the organ of hearing; and thus appeared to him, in a great degree, to account for the extraordinary faculty above described.

Reproduction.—The male organs nearly approach those of the quadrumana and man in many respects. The principal organ is pendulous, but it is furnished with a small bone. The testicles are situated in the abdomen, excepting in the breeding season, when they descend and are placed on each side of the vent, and the epididymis lies behind them on either side of the insertion of the tail. There are *vesiculæ seminales*, a *prostate gland*, and *Cowper's glands*.

There is no great peculiarity in the female organs. The two teats are placed on the breast as in man and in the quadrumana. As for those so-called teats, discovered in the groin of the *Rhinolophi* by Montagu and Geoffroy, Kuhl could discover no trace of mammary glands in them.

Geographical Distribution.—The cheiroptera are widely spread over the globe. They are to be found in the Old and New World and in New Holland. A tolerably temperate climate seems necessary for them, and the greatest development of the form takes places in warm countries. Dr. Richardson (*Fauna Boreali-Americana*) notices two species, *Vespertilio pruinosus* (Say) caught at Cumberland House, on the Saskatchewan in lat. 54, and *Vespertilio subulatus* (Say) which the Dr. observes is the most common species near the eastern base of the Rocky Mountains on the upper branches of the Saskatchewan and Peace rivers.

Habits.—Generally speaking they remain in concealment during the day in caverns, ruinous buildings, hollow trees, and such hiding places, and flit forth at twilight or sunset to take their prey. White, in his 'Selborne,' thus describes the mode of feeding of a tame bat: 'It would take flies out of a person's hand; if you gave it anything to eat it brought its wings round before the mouth, hovering and hiding its head, in the manner of birds of prey when they feed. The adroitness it showed in shearing off the wings of flies, which were always rejected, was worthy of observation and pleased me much. Insects seemed to be most acceptable, though it did not refuse raw flesh when offered; so that the notion that bats go down chimneys and gnaw men's bacon, seems no improbable story. While I amused myself with this wonderful quadruped I saw it several times confute the vulgar opinion, that bats, when down on a flat surface, cannot get on the wing again, by rising with great ease from the floor. It ran, I observed, with more dispatch than I was aware of, but in a most ridiculous and grotesque manner.' The large-eared bats, collected by Carlise, refused, according to Shaw, every species of food for four days, as did a large number which were afterwards caught and preserved in a dark box, for above a week. During the day-time they were extremely desirous of retirement and darkness; and, while confined to the box, never moved or endeavoured to get out the whole day; and when spread on the carpet they commonly rested some minutes, and then, beginning to look about, crawled slowly to a dark corner or crevice. At sunset the scene was quite changed: every one then endeavoured to scratch its way out of the box; a continual chirping was kept up, and no sooner was the lid of their prison opened than each was active to escape; either flying away immediately, or running nimbly to a convenient place for taking wing. When these bats were first collected, several of the females had young ones clinging to their breasts in the act of sucking. One of them flew with perfect ease, though two little ones were thus attached to her, which weighed nearly as much as the parent. All the young were devoid of down, and of a black colour. But one of the most interesting and detailed accounts of the habits of these animals is to be found in the statement made by Mr. George Daniell to the Zoological Society of London on the 11th November, 1834, and we accordingly give it from the 'Proceedings' of that society. The bats consisted of two species, the *Pipistrelle* (*Vespertilio Pipistrellus* of Geoffroy) and the *Noctule* (*Vespertilio Noctula* of Schreber). Mr. Daniell stated that in July, 1833, he received five specimens, all pregnant females, from Elvetham in Hampshire. Many more were congregated together with them in the ruins of the barn in which they were taken, but all the rest escaped. They had been kept in a tin powder canister for several days, and on being turned loose into a common packing case, with a few strips of deal nailed over it to form a cage, they exhibited much activity, progressing rapidly

along the bottom of the box, ascending by the bars to the top, and then throwing themselves off as if endeavouring to fly. They ate flies when offered to them, seizing them with the greatest eagerness, and devouring them greedily, all of them congregating together at the end of the box at which they were fed, and crawling over, snapping at, and biting each other, at the same time uttering a grating kind of squeak. Cooked meat was next presented to them, and rejected; but raw beef was eaten by them with avidity, and with an evident preference for such pieces as had been moistened with water. This answered a double purpose; the weather being warm numbers of the blue-bottle flies (*musca vomitoria* of Linnæus) were attracted to the meat; and on approaching within range of the bats' wings were struck down by their action, the animal itself falling at the same moment with all its membranes expanded, and cowering over the prostrate fly, with its head thrust under in order to secure its prey. When the head was again drawn forth the membranes were immediately closed, and the fly was observed to be almost invariably taken by the head. Mastication appeared to be a laboured operation, consisting of a succession of eager bites and snaps, and the sucking process (if it may be so termed), by which the insect was drawn into the mouth, being much assisted by the looseness of the lips. Several minutes were employed in devouring a large fly. In the first instance the flies were eaten entire, but Mr. Daniell afterwards observed detached wings in the bottom of the box. These, however, he never saw rejected, and he is inclined to think that they are generally swallowed. A slice of beef attached to the side of the box was found not only to save trouble in feeding, but also by attracting the flies to afford good sport in observing the animals obtain their food. Their olfactory nerves appear to be very acutely sensible. When hanging by their posterior extremities, and attached to one of the bars in front of the cage, a small piece of beef placed at a little distance from their noses would remain unnoticed; but when a fly was placed in the same situation they would instantly begin snapping after it. The beef they would eat when hungry; but they never refused a fly. In the day-time they sometimes clustered together in a corner; but towards evening they became very lively, and gave rapid utterance to their harsh grating notes. One of them died on the fifth day after they came into Mr. Daniell's possession; two on the fourteenth; the fourth survived until the eighteenth: and the fifth until the nineteenth day. Each was found to contain a single *fœtus*.

On the 16th May, 1834, Mr. Daniell procured from Hertfordshire five specimens of *Vespertilio noctula*, four females and one male. The latter was exceedingly restless and savage, biting the females, and breaking his teeth against the wires of the cage, in his attempts to escape from his place of confinement. He rejected food and died on the 18th. Up to this time the remaining four continued sulky; but towards evening they ate a few small pieces of raw beef, in preference to flies, beetles, or gentles, all of which were offered to them: only one of them, however, fed kindly. On the 20th one died, and on the 22nd two others, each of which was found to be pregnant with a single *fœtus*. The survivor was tried with a variety of food, and, evincing a decided preference for the hearts, livers, &c., of fowls, was fed constantly upon them for a month. In the course of this time large flies were frequently offered to her, but they were always rejected, although one or two *May chafers, Melolontha vulgaris*, were partially eaten. In taking the food the wings were not thrown forward as in the *Pipistrelle*, and the food was seized with an action similar to that of a dog. The water that drained from the food was lapped, but the head was not raised in drinking, as Mr. Daniell had observed it to be in the Pipistrelle. The animal took considerable pains in cleaning herself, using the posterior extremities as a comb, parting the hair on either side from head to tail, and forming a straight line along the middle of the back. The membrane of the wings was cleaned by forcing the nose through the folds and thereby expanding them. Up to the 20th June the animal fed freely, and at times voraciously, remaining during the day suspended by the posterior extremities at the top of the cage, and coming down in the evening to its food: the quantity eaten sometimes exceeded half an ounce, although the weight of the animal itself was not more than ten drachms.* On the 23rd Mr. Daniell, observing her to be very restless, was induced to watch her proceedings. The uneasiness was continued for upwards of an hour, the animal remaining all this time in her usual attitude suspended by the posterior extremities; on a sudden she reversed her position, and attached herself by her anterior limbs to a cross wire of the cage, stretching her hind legs to their utmost extent, curving the tail upwards, and expanding the interfemoral membrane so as to form a perfect nest-like cavity for the reception of the young. In a few moments the snout of the young one made its appearance, and in about five minutes the whole of its head was protruded. The female then struggled considerably until the extremities of the radii had passed, after which the young one by means of a lateral motion of its fore limbs relieved itself. It was born on its back, perfectly destitute of hair, and blind; and was attached by an umbilical cord of about two inches in length. The female then licked it clean, turning it over in its nest, and afterwards resuming her usual position, and placing the young in the membrane of her wing, proceeded to gnaw off the umbilical cord and eat the *placenta*. She next cleaned herself, and wrapped up the young so closely as to prevent any observation of the process of suckling. The time occupied in the birth was seventeen minutes. At the time of its birth the young was larger than a new-born mouse, and its hind legs and claws were remarkably strong and serviceable, enabling it not only to cling to its dam, but also to the deal sides of the cage. On the 24th the animal took her food in the morning, and appeared very careful of her young, shifting it occasionally from side to side to suckle it, and folding it in the membranes of the tail and wings. On these occasions her usual position was reversed. In the evening she was found dead, but the young was still alive, and attached to the nipple, from which it was with some difficulty removed. It took milk from a sponge, was kept carefully wrapped up in flannel, and survived eight days, at the end of which period its eyes were not opened, and it had acquired very little hair. From these observations it is evident that the period of gestation in the *Noctule* exceeds thirty-eight days. We have only to add to this interesting account that the *Cheiroptera* hybernate.

SYSTEMATIC ARRANGEMENT.

Among the ancients Aristotle says but little about the bat, and Pliny is considered to have placed it among the birds, none of which, he observes, with the exception of the bat, have teeth. (*Hist. Nat.* lib. xi., c. xxxvii.) Again (lib. x., c. lxi), he notices it as the only winged animal that suckles its young, and observes on its embracing its two little ones and flying about with them*. In this arrangement he was followed by the older of the more modern naturalists; Belon, Gesner, and Aldrovandus, for instance. The former, after expressing some doubt, places it at the end of the night birds, in his *Histoire de la Nature des Oyseaux* (folio, 1555), and it occupies the same position in the small 4to (1557), with the following quatrain:

'La Souris Chauve est un oiseau de nuict,
Qui point ne pond, ains ses petits enfante,
Lesquels de laict de ses tetins sustante,
En petit corps grande vertu reluit.'

The bat, *Attaleph* (bird of darkness), was one of the unclean animals of the Hebrews (*Deut.* xiv. 18), where it is placed among the forbidden birds.

Under the title 'Vespertilio,' the fourth and last genus of his first order, *Primates*, Linnæus arranged all the *Cheiroptera* known to him, and the number of species recorded in the twelfth edition of the *Systema Naturæ* amounts only to six. In the thirteenth edition (Gmelin's) the number of species given amounts to twenty-three. This edition was printed in 1789, and few families afford stronger evidence of the great influx of the new species within the last five and forty years than is to be found in the numbers of *Cheiroptera* which have been described within that period. Of English bats alone Jenyns enumerates sixteen species, and the general numbers have been increased more than six-fold. Cuvier made the *Cheiroptera* the first family of his third order of Mammifers, placing them next to the *Lemuridæ*, which close his second order, *Quadrumana*. Jenyns, in his 'Manual of British Vertebrate Animals,' places them under the order *Primates*, which he makes the second in his arrangement of British Mammalia, the *Feræ* being the first,

* In the index to the Leyden edition (folio, 1548), the expression used is 'Vespertilio sola avium lacte nutrit;' but 'volucrum' is the expression in the text—both in book x., and book xi. The tenth book begins, 'Sequitur natura avium,' and the bat is placed (c. lxi.), at the end of the chapters on birds; the rest of the book being occupied with general zoological observations.

and they come immediately after the shrews and the hedgehog.

D'Azara, Illiger, Geoffroy St. Hilaire, Desmarest, the Cuviers, Lesson, Bechstein, Kuhl, Leisler, Natterer, Temminck, Rüppel, and Spix, are among the most distinguished foreign writers on this family; and Pennant, Montagu, Sowerby, Gray, Horsfield, and Bell, among those of our own country. Zoologists seem generally to have agreed that the teeth should be made the great ground-work of classification in this as in other mammiferous families. Temminck, however, in his sixth *Monographie de Mammalogie*, shows that the genus *Dysopes* of Illiger is synonymous with the *Molossus* of M. Geoffroy St. Hilaire, and also with *Nyctinomus*. *Cheiromeles torqualus* of Horsfield is also regarded by Temminck as a *Dysopes*. To establish the identity of *Molossus* and *Nyctinomus* with *Dysopes*, the distinction of which rested only on the number of the incisor teeth of the jaw, Temminck shows that the character of these teeth varies according to the age of the individual, and that those of the upper jaw also vary in number, the dentary formula, with regard to the incisors, being either $\frac{2}{6}$, $\frac{2}{6}$, $\frac{2}{4}$, $\frac{2}{3}$ and even $\frac{2}{6}$. The lower incisors are displaced gradually by the development of the base of the canine teeth, and the projecting lateral points eventually perform the office of incisors, being opposed while in action on food to the incisors of the upper jaw, which are worn away by them. The author of the review on Temminck's sixth monograph*, where the latter describes the facts as they were observed by him in seven of the eleven species, thus proceeds: 'In order to show the mode of proof adopted by him, we follow him through one of the instances which he has adduced, that of the *Dysopes nasutus*, described by M. Isidore Geoffroy St. Hilaire as the *Nyctinomus Brasiliensis*. In one young individual of this species there existed in the lower jaw six incisors; in another five, three being on one side and two on the other; in a third four only; and in the upper jaw of this specimen, three incisors, with the alveolus, partly closed, of a fourth; in about thirteen other specimens, the number of incisors in the lower jaw was four: and in two full-grown individuals there were only two. The entire absence of even these has been found in *Dysopes obscurus*. Another observation will carry almost beyond the possibility of doubt the proof of the identity of *Nyctinomus* with *Molossus*. The type of the former genus, *Nyctinomus Ægyptiacus*, Geoff., possesses in its early age the four incisor teeth, which have been made to characterize the group, but loses two of them, when arrived at its full growth, and thus becomes an undisputed *Molossus*.' On the importance of these remarks we need not observe. The anomalies which exist in the dentary system of the *Cheiroptera* have long been a stumbling block to zoologists, and can only be explained by a continued and extensive series of minute examinations, similar to those to which M. Temminck has subjected them. They afford an additional proof, if such were wanting, that a system founded on any one set of organs, however important, must become in some of its parts deficient and inadequate; it must degenerate into a mere artificial method, the natural one being attainable only by a well-directed study of the whole organization. Having drawn the attention of the reader to these observations, we proceed to a classification of the family, taken, in great measure, from the French authors, and adopted by Desmarest and Lesson. *Galeopithecus*, which is the type of the first tribe of *Cheiroptera*, according to Lesson, we have removed, in accordance with the opinions of other zoologists, from this family; and though the *Vespertilionidæ* may be divided into two natural sections, the insectivorous bats and the fruit-eaters, we have, in consideration of the gradual shades of form when the numerous species are brought under observation, followed M. Lesson's arrangement, with the exception above alluded to.

VESPERTILIONIDÆ.

§ 1. Istiophori, Spix.

Bats having a membrane in form of a leaf upon the nose. Molar teeth with sharp tubercles.

1. Sub-family, *Phyllostomatina*.

Nose-leaf simple, solitary or unequal, the forefinger composed of two joints.

Genera, Phyllostoma, Geoff.

Four incisors above and the same number below. Canine teeth very strong. Nose supporting two nasal crests, one leaf-like, the other like a horseshoe. Ears large. Internal *oreillon* dentelated. Tongue bristled with papillæ. Tail variable in length, sometimes none. Dentary formula: Incisors $\frac{4}{4}$, canines $\frac{1-1}{1-1}$, molars $\frac{5-5}{5-5}=32$.

a. Tail shorter than the interfemoral membrane.

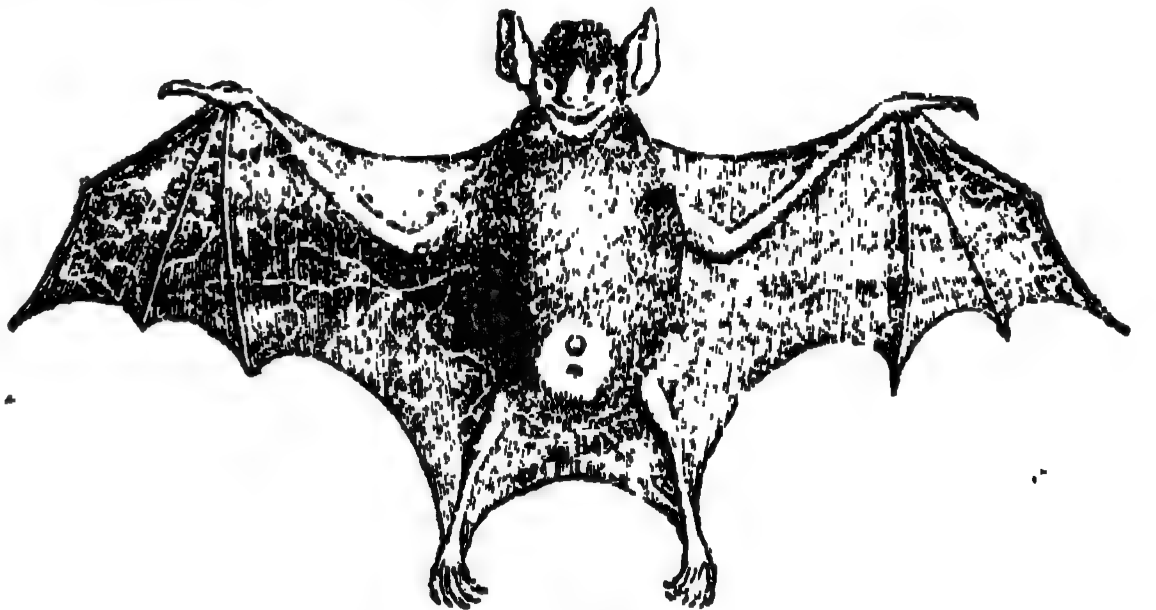
Example. *Phyllostoma crenulatum*. The borders of the nasal leaf are dentelated, the end of the tail free. Locality unknown.



[Phyllostoma crenulatum.]

b. No tail.

Example. *Phyllostoma perspicillatum*, Geoff. *Vespertilio perspicillatus*, Linn.



[Phyllostoma perspicillatum.]

Vampirus, Geoff. and F. Cuvier.

The same character as in the *Phyllostomata*, with the exception of the dental formula, which is as follows: incisors $\frac{4}{4}$, canines $\frac{1-1}{1-1}$, molars $\frac{5-5}{6-6}=34$.



[Teeth of Vampirus Spectrum.]

Example. *Vampirus spectrum*. This is the celebrated Vampire Bat of which so many bloodthirsty stories have been told; the *Phyllostoma spectrum* of some authors, *Vampirus sanguisuga* of others, the *Andira-guacu* of Piso, and the *Vespertilio spectrum* of Linnæus. The nose-leaf is entire, higher than it is wide, although it becomes widened at the base. The following is Piso's account of its habits. 'They seek out every kind of animal and suck their blood. But in Maranhan (Maranham) there is a certain kind of bats which approach by night the naked feet of men, and wound them with their *rostrum* for the sake of sucking human blood. The bite is so slight and subtle that the wounded do not feel it before the bed covered with blood gives token of the wound. So great a quantity of blood flows from the envenomed bite that it can only be stopped with difficulty, and the peril is imminent unless a cure by the prescribed remedies be effected. The inhabitants first wash these wounds with hot sea-water, and afterwards apply hot ashes, or even cautery, if the blood be

* Zool. Journ., vol. iii., p. 459.

not stopped.' Captain Stedman, who states that he was bitten, thus describes the operation: 'Knowing by instinct that the person they intend to attack is in a sound slumber, they generally alight near the feet, where, while the creature continues fanning with its enormous wings, which keeps one cool, he bites a piece out of the tip of the great toe, so very small indeed that the head of a pin could be scarcely received into the wound, which is consequently not painful; yet through this orifice he continues to suck the blood, until he is obliged to disgorge. He then begins again, and thus continues sucking and disgorging till he is scarcely able to fly; and the sufferer has often been known to sleep from time into eternity. Cattle they generally bite in the ear, but always in places where the blood flows spontaneously.... Having applied tobacco ashes as the best remedy, and washed the gore from myself and my hammock, I observed several small heaps of congealed blood all round the place where I had lain, upon the ground, on examining which, the surgeon judged that I had lost at least twelve or fourteen ounces during the night.' This is sufficiently circumstantial, and the narrative is assisted by Mr. Wood, who quotes the passage in his *Zoography*, and who informs us 'that it is said to perform the operation by inserting its aculeated tongue into the vein of a sleeping person with so much dexterity as not to be felt; at the same time fanning the air with its large wings, and thus producing a sensation so delightfully cool that the sleep is rendered still more profound, and the unfortunate person reduced almost to death before he awakes.' And the same author further informs us that 'there is reason to believe that this thirst after blood is not confined to the bats of one continent, nor to one species, since at Java they seldom fail to attack those persons who lie with their feet uncovered.' The same sort of stories are to be found in most books of Natural History up to a late period. Wood's work was published in 1807, and the tales are continued in Bewick in the edition of 1820. Cuvier, in the last edition of the *Règne Animal* (1829), says, 'They have accused this species of having caused men and beasts to perish by sucking them, but it contents itself with making very small wounds which may sometimes become envenomed by the climate.' Lesson (1827), in his notice of the genus, says, 'The single American species is celebrated by the fables with which they have accompanied its history.' Dr. Horsfield, who paid particular attention to the Javanese bats, does not say a word of their blood thirsty propensities. That some of the *Phyllostomata* suck the blood of animals as well as the juices of succulent fruits, zoologists are agreed, and we have above endeavoured to describe the peculiar apparatus with which they are furnished. Where the 'aculeated tongue' fitted for insertion 'into the vein of a sleeping person' is to be found among the known bats, we are ignorant. The rough tongue of the genus *Pteropus* has been supposed to have been employed for abrading the skin to enable the animal to suck the part abraded, but zoologists are now agreed that the supposition is groundless. It is more than probable that the celebrated vampire superstition and the blood-sucking qualities attributed to the bat have some connexion with each other.

Piso describes the bodies of his Bats (*Andira-guacu*) as being as large as European pigeons.



[Vampirus Spectrum.]

Madateus, Leach.

Characterized by four incisors in each jaw; the two intermediate upper ones are longer than the lateral; they are bifid; the lower incisors are equal, simple, and pointed. Four molar teeth in the upper and five in the lower jaw on each side. Two nasal leaves. No tail. Lips furnished with soft fringed and compressed papillæ. Tongue bifid at the point.

Example. *Madateus Lewisii.* Nasal leaf suddenly pointed; ears moderate and rounded. Fur blackish. Interfemoral membrane notched. Expansion 16 inches. Locality, Jamaica.

Glossophaga.

Four incisors in each jaw; canines moderately strong. Tongue very long, extensile, and terminated by a sort of sucker. Nose surmounted by a crest in form of a pike-head. Tail none, or variable in length. Interfemoral membrane very small, hardly any. Dental formula: incisors $\frac{4}{4}$, canines $\frac{1-1}{1-1}$, molars, $\frac{3-3}{3-3}=24$. Locality entirely American. The extensile tongue, says Lesson, enables the species to suck the blood of animals.

Example. *Glossophaga soricina* of Geoffroy, *Vespertilio soricinus* of Pallas and Gmelin. Interfemoral membrane comparatively large. No tail. Locality, Surinam and Cayenne.

Rhinopoma, Geoff.

Two incisors in the upper jaw, four in the lower. Nose long, conical, cut square as it were at the end, and surmounted with a small leaf. Nostrils straight, transversal, and operculated. Ears large, earlet (*oreillon*) external. Tail long, enveloped at its base in the interfemoral membrane, which is cut, as it were, square, and free at the extremity. Dental formula: incisors $\frac{2}{4}$, canines $\frac{1-1}{1-1}$, molars $\frac{4-4}{5-5}=28$. There are two species only, one African, the other American.

Example. *Rhinopoma microphylla.* This is Belon's *Chauve-souris d'Egypte.* The fur is ash-coloured, and the tail very long and slender. It is the species that abounds in the long and dreary galleries of the Egyptian Pyramids.

Artibeus, Leach.

Four incisors in each jaw, of which the upper ones are bifid, and the lower ones truncated. Two canines above and the same number below; the upper ones have an internal border at their base. Four molars above and five below on each side. Two nasal leaflets, one horizontal, the other vertical. No tail.

Example. *Artibeus Jamaicensis*, the only species known. Brown above, greyish below. Flying membranes, and ears brownish. The lips are surrounded with a regular series of warts, and the mouth is provided internally with a narrow, fimbriated, cribriform membrane. Expansion about one foot, three inches. Length from the muzzle to the extremity of the interfemoral membrane, four inches, ten lines. Dr. Horsfield calls it *Phyllostoma Jamaicense*, and says that in many particulars it agrees with *Phyllostoma planirostrum* of Spix, though it is clearly distinguishable from it.

Monophyllus, Leach.

Four unequal incisors in the upper jaw, of which the two middle ones are longer than the lateral, and bifid, none in the lower jaw: Two canines in each jaw. Five molars above and six below on each side. A single straight leaf upon the nose. Tail short.

Example. *Monophyllus Redmannii.* Brown above, greyish below. Ears rounded. Nose-leaf, which is sharp, covered with small white hairs. Membranes brown. Locality, Jamaica.

2. Sub-family, *Rhinolophina.*

Nasal leaf complicated, membranous. Index with a single phalanx. Wings largely developed. Females with pectoral teats often accompanied by pubic warts simulating mamillæ.



[Head and skull of Rhinolophus tridens.]

Genera, Rhinolophus, Geoff.

Nose at the bottom of a cavity bordered by a wide crest of a horseshoe shape, and surmounted by a leaf. Ears moderate, lateral, without an earlet (oreillon). Tail long, en-

tirely enveloped by the interfemoral membrane, which is very much developed. Dental formula: incisors, $\frac{2}{4}$, canines, $\frac{1-1}{1-1}$, molars, $\frac{5-5}{6-6}$ = 32. Several species.

Example. *Rhinolophus nobilis*, a rare and fine Javanese species; *Kebblêk* of the natives, described by Dr. Horsfield, who observes that it belongs to the second section of the genus. The nasal apparatus consists of a broad membrane stretching transversely across the nose in form of a shelf; the sides are bounded by several parallel folds, and inferiorly it constitutes a semicircular envelope, which has a short, obtusely-rounded point in the middle. Colour above, pure brown; beneath, brown variegated with grey. Fur remarkably long and silky, and supplied with a most delicate down at the base, so as to be throughout very soft to the touch. Body four inches in length. Expansion nineteen inches and a half.

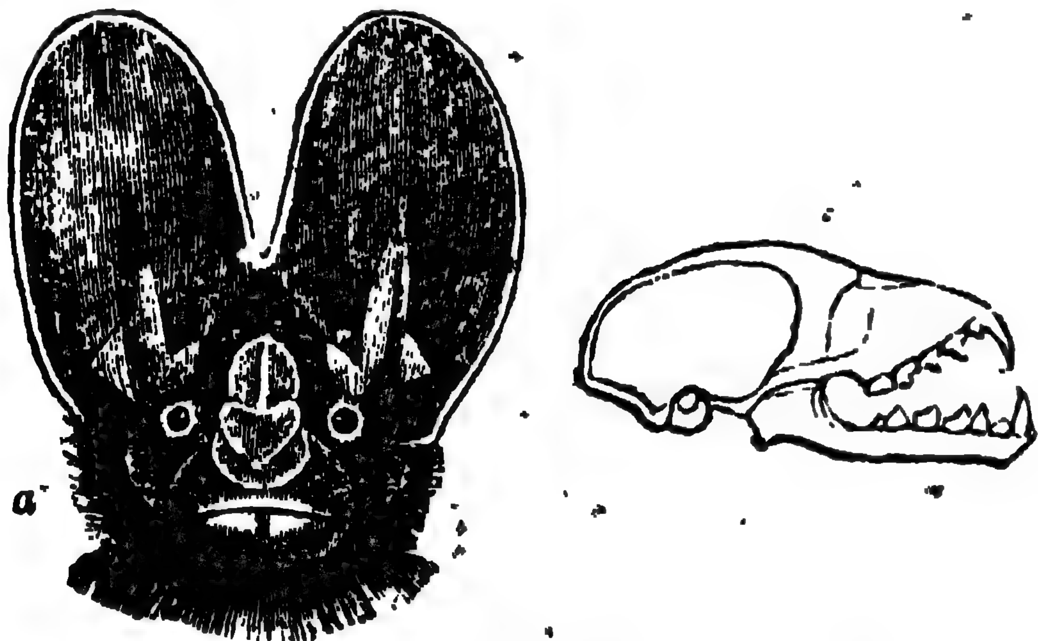


[Rhinolophus nobilis.]

Megaderma, Geoff.

Ears very much developed, and brought forward on the head. Earlet internal, wide. Three nasal crests, one vertical, one horizontal, and one inferior of a horseshoe shape. No tail. Interfemoral membrane cut square. Dental formula: incisors, $\frac{0}{4}$, canines, $\frac{1-1}{1-1}$, molars, $\frac{4-4}{5-5}$ = 26.

Example. *Megaderma trifolium*. Locality, Java, where it is the *Lovo* of the natives.



[*a*, Head of Megaderma Trifolium; *b*, Skull of Megaderma Frons.]

Nycteris, Geoff.

A very deep longitudinal *sillon* upon the *chanfrein*. Nostrils covered by a cartilaginous moveable operculum. Ears large, united at their base. Earlet external. Interfemoral membrane very large, comprehending the tail, the last vertebra of which is terminated by a bifurcated cartilage. Dental formula: incisors, $\frac{4}{6}$, canines, $\frac{1-1}{1-1}$, molars, $\frac{4-4}{5-5}$ = 32.

Example. *Nycteris Geoffroyi*. Fur, grey-brown above; brighter below. Ears very large. A well-developed wart placed upon the lower lip, between two *bourrelets* having the form of a Y. Locality, the Thebaïd and Senegal.

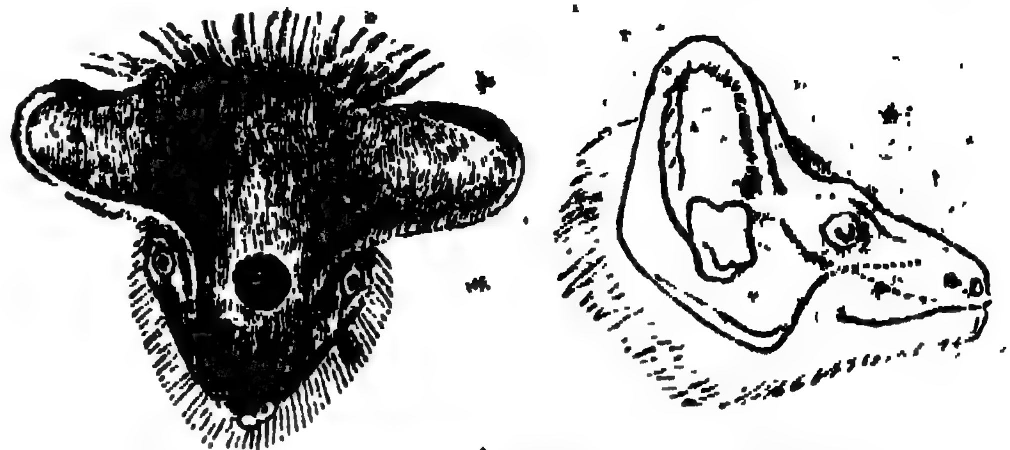


[Nycteris Geoffroyi, and Skull.]

Taphozous, Geoff.

Chanfrein with a *sillon*. Upper lip thick. Ears moderate and wide apart. Tail fine towards its point, beyond the interfemoral membrane, which is large, prolonged and angular at its external border. Dental formula: incisors, $\frac{0}{4}$, canines, $\frac{1-1}{1-1}$, molars, $\frac{5-5}{5-5}$ = 28. Several species.

Example. *Taphozous Mauritianus*. Fur chestnut above, ruddy below. Earlet terminated by a sinuous border. Locality, Isle of France.



[Taphozous Mauritianus, and profile of the same.]

Mormops, Leach.

Four upper unequal incisors, of which the intermediate ones are widely notched, and four below which are equal and trifid; two canines in each jaw, the upper ones twice the length of those below, almost compressed and canaliculated before; five molars above, and six below on each side. A single nasal leaf united to the ears, which are very complicated.

Example. *Mormops Blainvillii*, the only species; and it is remarkable for the extreme elevation of its front, the excavation of its chanfrein, the lobated, crenelated form of its upper lip, and the division of the lower one into three membranous lobes, the existence on the tongue of papillæ, of which the anterior are bifid and the posterior multifid, the folding of the nasal leaf, and the division of the upper border of its ears into two lobes. Locality, Jamaica.

Nyctophilus, Leach.

Two upper, elongated, conical, pointed incisors; six lower ones equal and trifid with rounded lobes; two canines above and two below, the lower ones having a small point at the back part of their base. Four molars on each side of the jaws, with crowns furnished with pointed tubercles. Two nasal leaves, of which the posterior is the largest. Tail projecting a little beyond the interfemoral membrane.

Example. *Nyctophilus Geoffroyi*, the only species known. Fur, yellowish above. Belly, breast and throat dirty white. Ears large. Membranes brownish-black.

§ 2. Anistiophori, Spix.

Bats without any nasal appendage.

3. Sub-family, *Vespertilionina*.

Molar teeth with pointed tubercles. Wings wide and extended. A single phalanx to the forefinger (index). Head elongated. The lips simple. Tongue short. Tail long.

Genera, Vespertilio, Linn., Geoff.

Upper incisors four, sometimes two. Lower incisors six. Muzzle very simple. Ears separated, but sometimes united at their base. Earlet internal. Tail long, entirely enveloped in the interfemoral membrane. Cheek pouches. Dental formula: incisors, $\frac{4}{6}$, canines, $\frac{1-1}{1-1}$, molars, $\frac{4-4}{5-5}$ = 32.

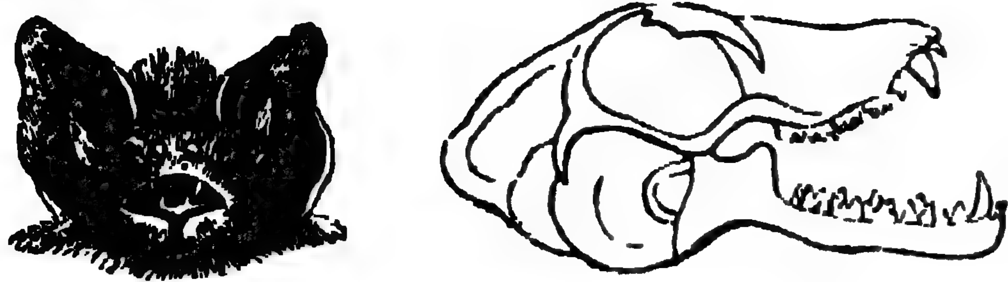
Lesson observes that many Vespertiliones have but two incisors. The species of the genus are many in number, and their geographical distribution is very wide.

a. European species.

These are numerous. We select as an example *Vespertilio murinus* of Linnæus. This is the *Flitter-mouse*, *Flutter-mouse* and *Rear-mouse* of the English; *La Chauve-souris* of Buffon, and, according to Pennant, the *Yslum* of the antient British; *Nattola*, *Notula*, *Sporteglione*, *Vispistrello* and *Vilpistrello* of the Italians; *Murcielago* and *Morciegalo* of the Spaniards; *Morcego* of the Portuguese; *Speckmaus* and *Fledermaus* of the Germans; *Vledermuys* of the Dutch; *Laderlap* and *Fladermus* of the Swedes; and *Flagermus* and *Aftenbakke* of the Danes. The ears are oval, of the length of the head; the earlets falciform. The

fur of the adults is ruddy-brown above, whitish-grey below; that of young individuals is grey-ash.

Locality. *Vespertilio murinus* is common in Europe. It has been supposed to exist in Asia, and even in Australia. Its haunts are caves, ruined buildings, church-towers, the roofs of houses or churches, and hollow trees, where it hybernates during the whole winter, snugly wrapped up in the wing-membranes, and suspended by the hind feet. We have given the skeleton of this species, and below will be found a head and skull of *Vespertilio pipistrellus*, another European species.



[Head and Skull of Vespertilio Pipistrellus.]

β. African species.

Example. *Vespertilio nigrita*. Adanson discovered this species at Senegal. The ears are oval, triangular, very short, one-third of the length of the head. Earlet long, and terminating in a point. Fur yellowish-brown above, and yellowish-ash below.

γ. Asiatic species.

Example. *Vespertilio pictus*. The ears are shorter than the head, oval, wider than they are high. Earlet oval-shaped. The fur is reddish, passing into bright yellow upon the back, and of a tarnished yellow on the belly. Citron-coloured rays mark the course of the fingers in the wings, which are chestnut-brown. Locality, Ceylon, where the native name is *Kirivoula*.

δ. American species.

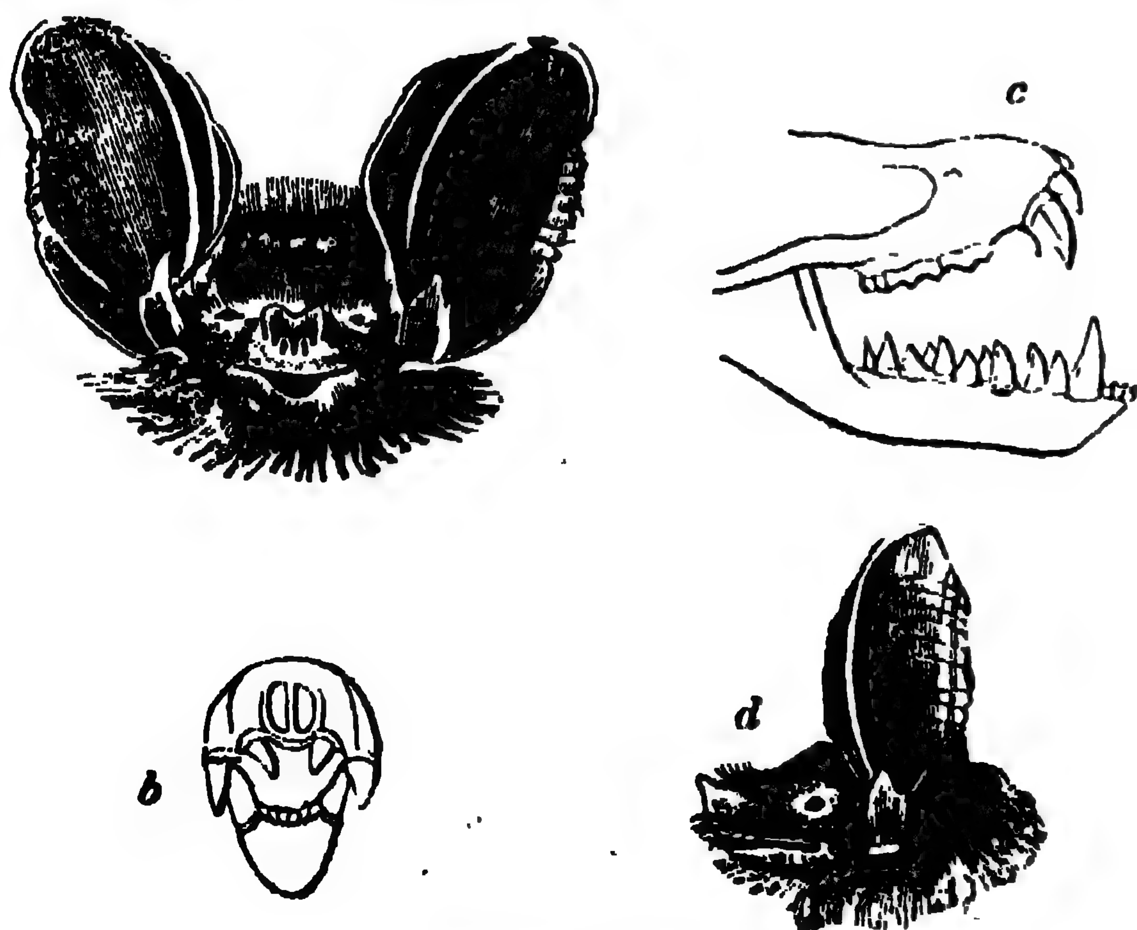
These are very numerous.

Example. *Vespertilio Naso*. This species, remarkable for the length of its nose, was first described by the Prince de Neuwied. The nasal organ is elongated in a straight line above the upper jaw, almost like a proboscis. The ears are small, and very much pointed. The fur is greyish-brown above, and yellowish-grey below. Locality, Brazil, in trees.

Plecotus, Geoff.

This genus in many of its characters agrees with *Vespertilio*, but the ears are very much developed, being larger than the head. Dental formula: incisors, $\frac{4}{6}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{5-5}{6-6}$ = 36. There are several species, and the form occurs in all the four quarters of the globe.

Example. *Plecotus Timoriensis*. This species was discovered by Péron and Lesueur in the island of Timor, one of the Moluccas. The ears are ample, united at their base by a small membrane. The fur is blackish-brown above, and ash-brown below.



[Plecotus Timoriensis.]

b, front view of the teeth, &c.; *c*, profile of the skull; *d*, profile of the head.

The genera *Atalapha*, *Hypexodon*, and *Nycticeus* of Rafinesque, are considered doubtful by Lesson and others.

Myopteris, Geoff.

The chanfrein is united and simple. The ears are large, insulated and lateral, with an internal earlet. Tail long, half enveloped in the interfemoral membrane. Muzzle short and large. Dental formula: incisors, $\frac{2}{2}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{4-4}{5-5}$ = 26.

Example. *Myopteris Daubentonii*, Geoff.; *Le Rat volant* (flying-rat) of Daubenton. The locality of this species is unknown. The upper part of the head and body is brown; beneath, the colour is dirty white, with a slight tinge of yellow.

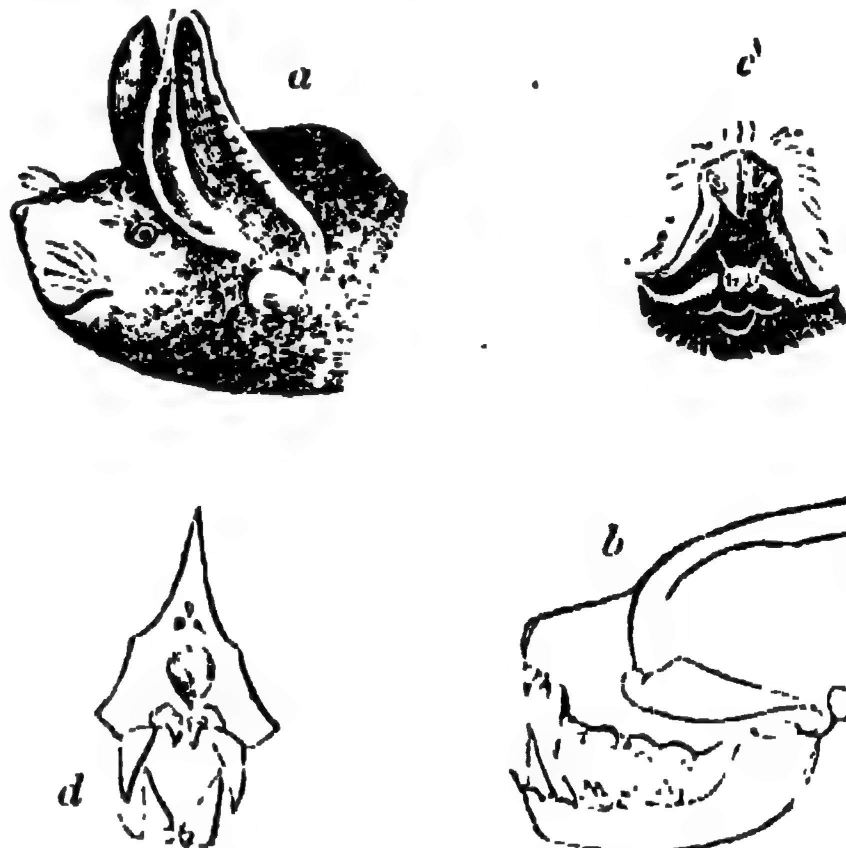
4. Sub-family, *Noctilionina*.

Molars tubercular. Wings long and straight. Two phalanges to the forefinger (index). Head short and obtuse. Lips very large. Tail recurved. The females often furnished with lateral pouches for the reception of the young in nursing.

Genera, Noctilio, Geoff.

Canines very strong. Muzzle short and swollen, and divided and studded with fleshy tubercles or warts. Nose simple, and losing itself in the lips. Ears small and lateral. Interfemoral membrane very much developed. Tail enveloped at its base. Dental formula: incisors, $\frac{4}{2}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{4-4}{5-5}$ = 28.

Example. *Noctilio leporinus*. Size of a rat. Fur of a uniform reddish-yellow. This is the *Vespertilio leporinus* of Gmelin; *Noctilio unicolor* of Geoffroy. Localities, Brazil, Peru, and Paraguay.



[Noctilio Leporinus.]

a, profile of head; *b*, profile of skull; *c*, front view of muzzle; *d*, front view of teeth, &c.

Dysopes, Illiger.

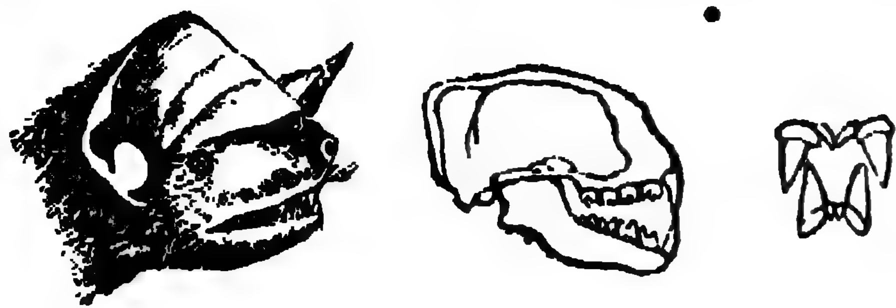
We have already noticed M. Temminck's opinion of the identity of *Molossus*, *Nyctinomus*, and *Cheiromeles* with *Dysopes*. The following is the character of the teeth, according to F. Cuvier: two incisors above and four below; two canines in each jaw; four molars on each side of the upper jaw, that is to say, two false and two normal; ten molars in the lower jaw, *viz.*, four false and six true. Type, *Dysopes Moops*. We proceed to give the definition of *Molossus*, *Cheiromeles*, and *Nyctinomus*, for the assistance of the student.

Molossus.

Head short; muzzle swollen. Ears large; earlet external. Interfemoral membrane straight, with a square termination. Tail long, enveloped at its base, and most frequently free at its extremity. Dental formula: incisors, $\frac{2}{2}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{5-5}{5-5}$ = 28. The geographical distribution of this form is wide: Africa, Asia, and South America possess it; but the species which are numerous occur principally in the two last-mentioned localities.

Example. *Molossus obscurus*, *Molossus fumarius* of Spix, *Dysopes obscurus* of Temminck. Size of the *Barbastelle* of Europe. Fur composed of hair of two colours,

blackish-brown above, and ash-brown below Whiskers at the border of the lips. Length about three inches, three lines. Expansion nine inches. Localities, Brazil and Guiana.



[Head of Molossus obscurus. Skull and front teeth.]

Cheiromeles, Horsfield.

Two incisors above and two below; the upper ones large, approximate, semiconical, and acute, the lower very small and simple. Muzzle conical, sulcated, and with setiferous glandules. Ears distant, patent, with a short, semicordate, obtuse operculum. Axillary pouch ample; but the hind foot, according to Dr. Horsfield, constitutes the chief distinguishing character. The hind foot, or rather hand, 'consists of four fingers, which have the same disposition and structure as in other animals of this family, and of a distinct thumb, essentially agreeing with this member in many *Quadrumana*, and in several animals of the *Rodentia* and *Marsupialia*. It is a complete antagonist to the fingers, enables the animal to take hold of objects, and thus constitutes a perfect hand.'

Example. *Cheiromeles torquatus*, Horsfield, Researches in Java, *Molossus Cheiropus*, Auct.; *Dysopes cheiropus*, Temminck. Length, five inches and a half. Expansion nearly two feet. Localities, Siam and Western Asia.

Nyctinomus, Geoff.

Nose flat, losing itself in the lips, which are deeply slit and wrinkled. Ears large, and hanging with an external earlet. Interfemoral membrane moderate and angular. Tail long, and nearly half of it enveloped. Dental formula: incisors, $\frac{2}{4}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{5-5}{5-5}$ = 30. Localities: this form occurs in Africa, Asia, and South America.

Example. *Nyctinomus Ægyptiacus*, Geoff.; *Dysopes Geoffroyii*, Temminck. Reddish above and brown below. Tail slender Interfemoral membrane enveloping only half of the tail. Locality, ruins and subterraneous places in Egypt.

Dinops, Savi.

Ears united and extended on the front. Lips pendent and plaited. Tail enveloped for half its length in the interfemoral membrane. Dental formula · incisors, $\frac{2}{6}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{5-5}{5-5}$ = 32.

Example. *Dinops Cestonii*, Savi. Fur thick and soft, grey-brown, tending slightly to yellowish, but a little browner on the back. Wings black-brown. Muzzle, lips, and ears black, the latter large, rounded, and a little notched on their external border. Tail long, of a brown-black. Locality, the environs of Pisa, where Savi discovered it.

Stenoderma, Geoff.

Nose simple. Ears small, lateral, and isolated; earlet internal. Interfemoral membrane rudimentary, and bordering the legs. No tail. Dental formula: incisors, $\frac{4}{4}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{4-4}{4-4}$ = 28: but it should be remembered that Cuvier only allows of two incisors in the upper jaw, instead of four, the number given by Geoffroy.

Example. *Stenoderma rufa.* Fur uniform, chestnut-red. Ears moderate, oval, and a little notched on their external border.

Celæno, Leach.

Two upper incisors pointed and simple; four lower ones contiguous and cylindrical. Two canines above and below, the upper ones largest. Four molars on each side of the jaws, the first pointed and simple, and the three last with their crowns beset with points. Third and fourth finger with three phalanges, the fifth or external with two only. Interfemoral membrane prolonged a little below the toes of the hind feet. Ears separated; earlets simple. No tail.

Example. *Celæno Brooksiana.* Back ferruginous; belly and shoulders yellowish-ferruginous. Ears pointed with the anterior border rounded and the posterior one straight. Membranes black.

Aëllo, Leach.

Two upper incisors large, compressed, bifid, and with rounded lobes. Two lower equal, trifid, with rounded lobes. Two upper canines, long, very sharp, with a small projecting point before and behind their base; the two lower smaller and less pointed. Four upper molars on each, the two first pointed and triangular, the second largest, the third bifid, and the fourth trifid externally. Third finger of the wings with four phalanges, fourth and fifth with three. Interfemoral membrane straight. Ears contiguous, short, very large; no earlet. Tail not exceeding the membrane.

Example. *Aëllo Cuvieri.* Colour ferruginous-Isabella. Wings obscure brown. Ears truncated, as it were, at the end.

Scotophilus, Leach.

Four upper incisors unequal, pointed, the intermediate ones being largest and simple, and the lateral ones bifid with equal lobes: six lower incisors indistinctly trifid. Two canines above and below, the upper ones with a small point behind their base, and the corner ones with a similar one in front. Four molars with crowns armed with points. Fourth and fifth fingers of the wings with three phalanges.

Example. *Scotophilus Kuhlii.* Fur ferruginous. Ears, nose, and wings brown.

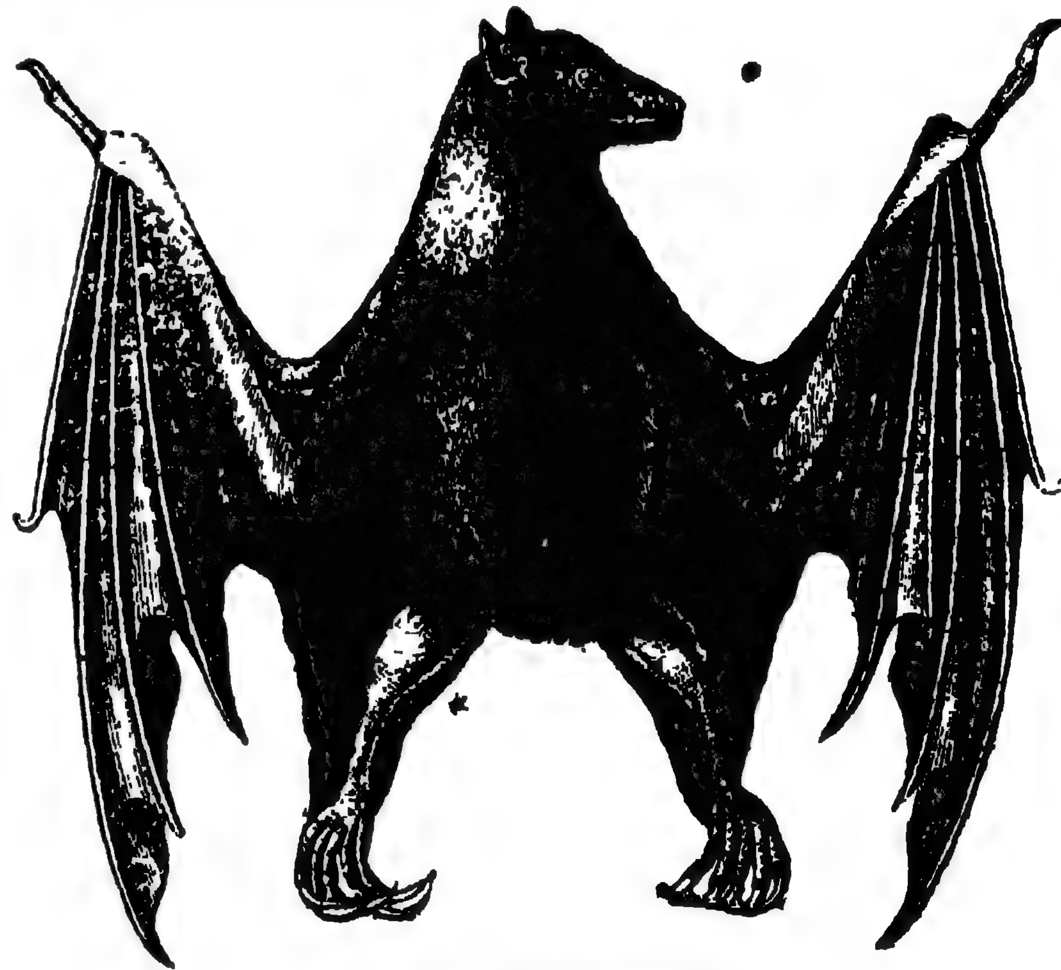
5. Sub-family, *Pteropina.*

We now come to a numerous and widely distributed family containing some of the largest forms of the Vespertilionidæ, and subsisting principally on vegetables and fruits. It is not improbable that the fabulous harpy may have had its origin in some of these enormous bats with their well developed pectoral mammæ.

Molar teeth tuberculated and grooved longitudinally. Wings rounded. Interfemoral membrane and tail often wanting. Index with three phalanges. Head long and hairy. Females for the most part with nursing pouches.

Genera, Pteropus, Brisson. (*Roussettes* of the French.)

A small nail on the index wing-finger. Head conical. Ears short. Tail absent, or rudimentary. Interfemoral membrane very little developed.



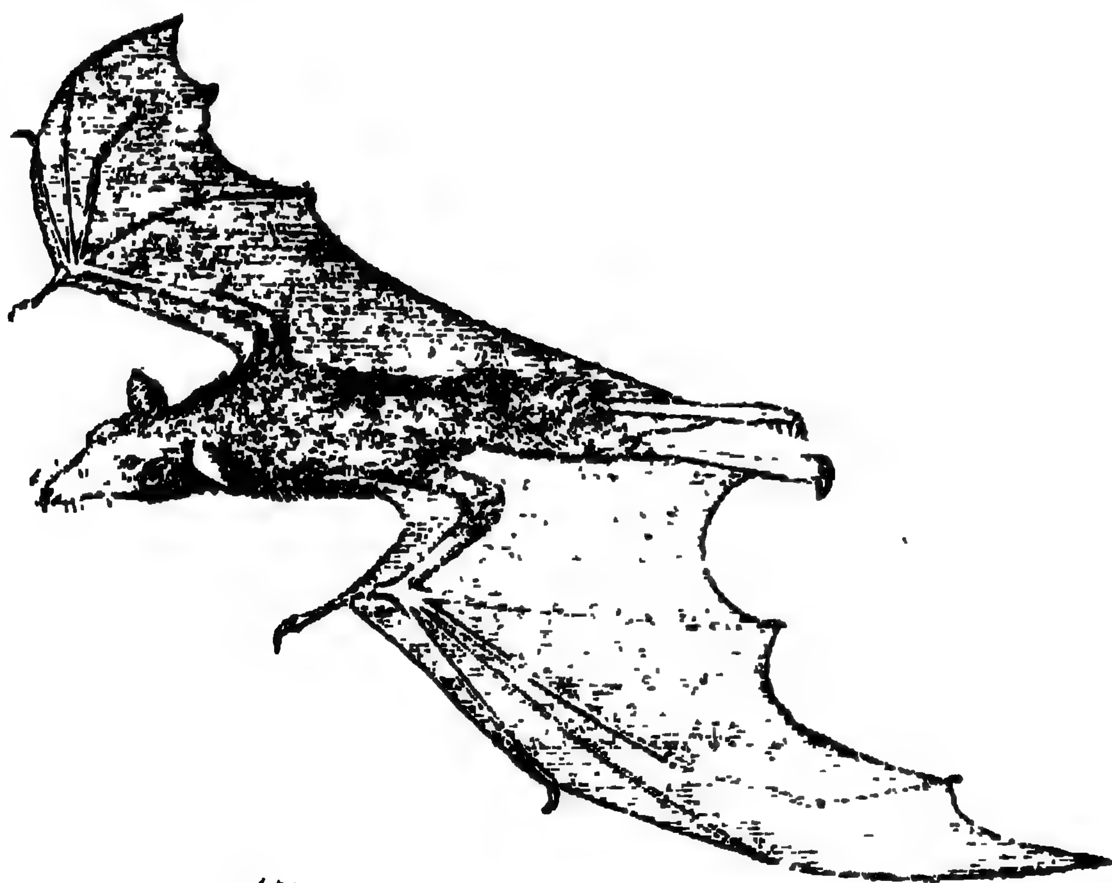
[Pteropus Dussumieri.*]

a. Tail-less.

Example. *Pteropus Javanicus.* Upper part of the neck smoky red, rest of the fur blackish, some white hairs mingled with the black ones of the back. Expansion five feet. This is the *Kalong* of the Javanese, which, according to Dr. Horsfield, is extremely abundant in the lower parts of Java, and uniformly lives in society. The more elevated districts are not visited by it. 'Numerous individuals,' continues the Doctor, 'select a large tree for their resort, and suspending themselves with the claws of their posterior extremities to the naked branches, often in companies of several hundreds, afford to a stranger a very singular spectacle. A species of Ficus, in habit resembling the Ficus religiosa of India, which is often found near the villages of the natives, affords them a very favourite retreat, and the extended branches of one of these are sometimes covered by them. They pass the greater portion of the day in sleep,

* For the arrangement of teeth in Pteropus, see Carnivora.

hanging motionless: ranged in succession, with the head downwards, the membrane contracted about the body, and often in close contact, they have little resemblance to living beings, and by a person not accustomed to their economy are readily mistaken for a part of the tree, or for a fruit of uncommon size suspended from its branches. In general those societies preserve a perfect silence during the day: but if they are disturbed, or if a contention arises among them, they emit sharp piercing shrieks, and their awkward attempts to extricate themselves when oppressed by the light of the sun, exhibit a ludicrous spectacle. In consequence of the sharpness of their claws, their attachment is so strong, that they cannot readily leave their hold without the assistance of the expanded membrane: and if suddenly killed in the natural attitude during the day, they continue suspended after death. It is necessary therefore to oblige them to take wing by alarming them, if it be desired to obtain them during the day. Soon after sunset they gradually quit their hold, and pursue their nocturnal flight in quest of food. They direct their course, by an unerring instinct, to the forests, villages, and plantations, occasioning incalculable mischief, attacking and devouring indiscriminately every kind of fruit, from the abundant and useful cocoa-nut which surrounds the dwelling of the meanest peasantry, to the rare and most delicate productions which are cultivated with care by princes and chiefs of distinction. By the latter, as well as by the European colonists, various methods are employed to protect the orchards and gardens. Delicate fruits, such as mangos, jambus, lansas, &c., as they approach to maturity, are ingeniously secured by means of a loose net or basket, skilfully constructed of split bamboo. Without this precaution, little valuable fruit would escape the ravages of the *Kalong*. There are few situations in the lower parts of Java, in which this night wanderer is not constantly observed: as soon as the light of the sun has retired, one animal is seen to follow the other at a small but irregular distance, and this succession continues uninterrupted till darkness obstructs the view. The flight of the Kalong is slow and steady, pursued in a straight line, and capable of long continuance. The chase of the Kalong forms occasionally an amusement of the colonists and inhabitants during the moonlight nights, which in the latitude of Java are uncommonly serene. He is watched in his descent to the fruit trees, and a discharge of small shot readily brings him to the ground. By this means I frequently obtained four or five individuals in the course of an hour.'



[Pteropus Javanicus.]

β. with tails.

Example. *Pteropus stramineus*. Fur reddish yellow; tail very short. Expansion two feet. Brought from Timor by Péron and Lesueur.

γ. with wings on the back.

Cephalotes, Geoff.

A small nail on the index in one species. Head conical; ears short; tail but little apparent. Interfemoral membrane notched. Flank-membrane springing from the mesial line of the back. Dental formula: incisors, $\frac{4}{6}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{5-5}{4-4}=32$.

Example. *Cephalotes Peronii*. Fur brown or red, and very short. No nail on the index. Wings springing from the middle of the back. Expansion two feet. Locality, Timor. N.B. Temminck thinks that the *Pteropus palliatus* of Geoffroy is the young of this species.

Harpya, Illiger.

Differing from Cephalotes in the want of lower incisors and of the last small molars in both jaws. Geoffroy thinks that the difference between the system of dentition in *Harpya* and *Cephalotes Peronii* is attributable to age only. Dental formula (Pallas): incisors, $\frac{2}{0}$; canines, $\frac{1-1}{1-1}$ molars, $\frac{4-4}{5-5}=24$.

Example. *Harpya Pallasii*, *Cephalotes Pallasii*, Geoff. Fur consisting of scanty and soft hairs, greyish-ash above, pale white below. A nail on the index. Expansion 1 foot 11 inches. Locality, the Moluccas.



[Head of Harpya Pallasii.]

Cynopteras, F. Cuvier.

Four incisors and two rudimentary false molars in each jaw, like the Pteropi, but they entirely want the last molars. The jaws are abbreviated, and the heads much resemble those of Cephalotes.

Macroglossa, F. Cuvier.

A genus approaching very closely to *Pteropus* and formed by M. F. Cuvier for the *Lowo-assu* of the Javanese, *Pteropus minimus* of Geoffroy, *Pteropus rostratus* of Horsfield. Its character depends upon the extreme length of the head, the absence of false molars, the great development of the posterior molar and the extensile tongue. Dental formula: incisors, $\frac{4}{4}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{5-5}{6-6}=34$.

Example, *Macroglossa Horsfieldii*, *Pteropus rostratus*, Horsfield. Temminck is of opinion that *Macroglossa Kiodotes*, *Pteropus minimus*, Geoff., and *Macroglossa Horsfieldii* are identical.

δ. Wings placed extremely backwards.

On the 13th October, 1835, at a meeting of the Zoological Society, Mr. Bennett called attention to a *Pteropine Bat* which had recently been obtained from the neighbourhood of the river Gambia, and which was exhibited. He directed especial notice to two large tufts of white hairs placed upon its shoulders and forming a very conspicuous feature in its appearance. These, he remarked, might probably cover cutaneous glands destined for the preparation of a secretion fitted to defend that part of the animal in its passage through the air, or perhaps to attract the opposite sex. It could scarcely be conceived that they have any influence in increasing the buoyancy of the animal; although the backward position of the wings might seem to render necessary such a supplemental aid; their position in advance of the ordinary alar membranes gives them, in fact some resemblance to supplementary wings.

He stated that on account, chiefly, of the position of th wings so far backward as almost to seem to be placed be hind the centre of gravity, he was disposed to consider the bat exhibited might be regarded as the type of a new genus, to which the name of *Epomophorus* might be given. But the genus would, he conceived, rest almost entirely on this single character, and he hesitated to propose it definitively until he had an opportunity of examining a specimen preserved in spirit, and consequently not liable to that distortion to which the individual skin exhibited might have been subjected. In one of the two other species of *Pteropi* previously obtained from the same country by Mr. Rendall, and brought under the notice of the Society on July 14th (*Pteropus Gambianus* and *Pteropus macrocephalus*), by Mr. Ogilby, the same backward position of the wings exists. In dentary characters the new species agrees with those just referred to, the only exception being in the presence of a third abnormal incisor on the left of the upper jaw.

Regarding it as a form of some interest to zoologists, Mr Bennett stated his intention to describe it more fully in a paper which he proposed to prepare on the subject. He

characterized it as the *Pteropus epomophorus**. Pale brown, the colour being paler posteriorly; belly white; humeral brush (or epaulette) white and large. Total length, six inches three quarters; length of the head, two inches and a quarter. Expansion twelve inches†.

On the 26th April, 1836, at a meeting of the Zoological Society of London, characters were read of *Vespertilionidæ* observed in the central region of Nepaul; being a communication transmitted to the Society by B. H. Hodgson, Esq., Corr. Memb. Z.S. They had already been published in the 'Journal of the Asiatic Society of Calcutta.'

The following are the species characterized in this communication:

Rhinopholus armiger, Hodgs.
Rhin. tragatus, Ej.
Pteropus leucocephalus, Ej.
Pter. pyrivorus, Ej.
Vespertilio formosus, Ej.
Vesp. fuliginosus, Ej.
Vesp. labiatus, Ej.

Mr. Hodgson's characters of these species are accompanied by remarks on the habits of the several genera of bats in the district in which they occur.

Bones of bats of existing species were found in the cavities of the gypsum at Köstritz, mixed with the remains of other existing species, and with the bones of extinct animals.

CHEIROSTE'MON PLATANOI'DES, a most singular plant belonging to the natural order Bombaceæ, and commonly called the 'hand-tree,' in consequence of its stamens being so arranged as to present an appearance somewhat similar to that of a human hand. It is a lofty tree, with the habit of a plane, and a trunk about as thick as a man's body; its head divides into a number of close horizontal branches, which are of a brownish colour towards their extremities in consequence of the number of short fawn-coloured hairs that beset them. The leaves are heart-shaped, slightly seven-lobed, six or eight inches long, and a little toothed; they are a rich deep green on the upper side, and are covered with fawn-coloured hairs on the under side. The flowers are of a bright red, and appear at the ends of the branches; they consist of three external lanceolate brownish bracts, and a bell-shaped fleshy angular calyx, about an inch and a half deep, bright red inside, covered externally with a russet down; it is deeply divided into five lobes, and is marked on the outside at the base with five prominences, which correspond with an equal number of little pits filled with a slightly viscid whitish fluid. There is no corolla. There are five stamens combined into a central column-like tube, from the apex of which proceed five long slender sharp-pointed processes, which are all curved one way, coloured red, and look very much like what one might imagine to be the claws of a demon's hand; on their convex side these processes bear the anthers. The fruit is a large woody five-celled five-valved capsule, with from fifteen to twenty seeds in each cell. The singular form of the stamens and their large size has rendered this tree an object of curiosity and veneration in Mexico from time immemorial; the native Mexicans call it by the unpronounceable name of *Macpalxochiquauhitl*, which the Spaniards translate *Arbol de Manitas*, and the English *Hand-tree*. What made it a greater object of admiration was that in all Mexico only one tree was known, which was near the town of Toluca, about sixteen leagues west of the city of Mexico. The flowers of this plant were so constantly gathered by the Indians as objects of veneration, that the fruit never ripened, and it was not till the year 1801 that cuttings transferred to the Botanic Garden at Mexico struck root, and began to multiply this vegetable wonder. The original tree must be much more antient than the conquest of Mexico, for it has been distinctly described by the Spanish historians. The people of Toluca imagine that the tree is one and indivisible, that no other was ever created, nor any ever propagated; seeds, however, have been produced from the young plants in the Botanic Garden, Mexico, whence they may now be procured without difficulty. Plants of it were thus obtained some years since by Mr. Lambert, of Boyton House, in Wiltshire, and they are not uncommon in large collections. As many Mexican plants are hardy in this country, it has been hoped that this curious tree would prove so too; a plant of it, however, exposed to the winter against a wall in the garden of the Horticultural Society at Turnham Green, near London, perished. And perhaps it is not likely that other attempts will prove more fortunate; for, in the first place, it belongs to the natural order Bombaceæ, which consists entirely of plants impatient of cold; and, secondly, notwithstanding the belief of the Mexicans to the contrary, it is really found wild in Guatemala, where whole forests of it were observed near the city of that name by one of the pupils of Professor Cervantes. The hand-tree is said to form a very large tree, which preserves its leaves all the year round, and forms a fine shady canopy, flowering in November, December, and January. (See Hernandez, *Hist. Plant. Nov. Hisp.*, vol. ii., ed. 2, p. 531; Vetancourt, *Theatr. Mexic.*; Larreategui, *Dissert.*, June, 1795; Tilesius in *Act. Petrop.*, 5, 321, t. ix.; Humb. and Bonpl., *Pl. Æquinoct.*, i., 85.)



[Cheirostemon platanoides.]

a, fruit opened; *b*, section of young fruit, showing the disposition of the seeds; *c*, pistil and bracts; *d*, flower opened to show the tube of the stamens and the five anthers; (all these figures are about one-sixth less than the natural size: those which follow are some of the natural size, and others slightly magnified;) *e*, *f*, *g*, seeds; *h*, *i*, sections showing the situation of the embryo; *k*, the embryo, placed to show the cotyledons.

CHEKE, SIR JOHN, a learned writer of the sixteenth century, descended from an antient family in the Isle of Wight, was born at Cambridge, June 16, 1514. He was admitted into St. John's College, Cambridge, in 1531, where his early studies were chiefly directed to the Latin and Greek languages, the latter of which was then almost universally neglected. After taking his degrees in arts, he was chosen Greek lecturer of the university, and about 1540 became the first professor of that language in the university, upon King Henry VIII.'s foundation. He was highly instrumental in bringing it into repute, and directed his attention more particularly to reform and restore, what he considered, the original pronunciation of it. Cheke, while professor, was at the same time University Orator. In 1543 he was incorporated M.A. at Oxford, where he also studied for a short time; and in 1544 was sent for to court, to be made joint-tutor for the Latin tongue with Sir Anthony Cooke to Prince Edward. He seems also to have had the Lady Elizabeth for some time under his care. About 1544 too he became a canon (it is believed a lay canon, for there

* Called Pteropus Whitei in the index.
† Proceedings of the Zoological Society of London, 1835, part iii. p. 149.

is no proof of his having taken orders) of King Henry VIII.'s first foundation of the college in Oxford, which has been since called Christ Church; but upon the dissolution of that foundation in 1545, he was allowed a pension in the room of his canonry. When Edward VI. came to the throne he rewarded Cheke with an annuity of a hundred marks, and made him one or two favourable grants in purchase of monastic property. In 1548 he had a grant of the college of Stoke by Clare, in Suffolk, and in the year following the house and site of the priory of Spalding in Lincolnshire; but surrendered his annuity upon receiving the latter grant. The king likewise caused him, by a mandamus, to be elected provost of King's College, Cambridge. In 1550 he was made chief gentleman of the king's privy chamber, and in 1551 received the honour of knighthood. About this time he was engaged in various conferences and disputations, on the Protestant side, on the subject of the sacrament, transubstantiation, &c. In 1552 he became clerk of the council, and soon after one of the secretaries of state, and privy-councillor. This was the height of Sir John Cheke's fortunes. His zeal for the Protestant religion induced him to approve of the settlement of the crown upon Lady Jane Gray; and he acted for a very short time as secretary to her and her council after King Edward's decease. Upon Mary's accession to the throne he was committed to the Tower, and an indictment was drawn up against him: but he remained in prison, and the year following, having been stripped of his whole substance, received a pardon, and was set at liberty September 3, 1554. Foreseeing the days of persecution, he obtained a licence to travel for some time, and went to Basle, and thence to Italy At Padua he renewed his Greek studies: and afterwards, in his return from Italy, settled at Strasburg, where he was so reduced in circumstances as to be obliged to read a Greek lecture for subsistence. In the beginning of 1556 he came, by a treacherous invitation, to Brussels, though under misgivings, which were only allayed by the consultation of astrology, a pseudo-science to which Sir John Cheke was unfortunately attached, and which upon this occasion deluded him. Between Brussels and Antwerp he fell into a snare. He was seized by order of Philip II., blind-folded, thrown into a waggon, conveyed to the nearest harbour, put on board a ship under hatches, and brought again to the Tower of London. He soon found that this was on account of his religion. The desire of gaining the reconciliation of so great a man to the Church of Rome induced the queen to send not only two of her chaplains, but Dr. Feckenham, at that time dean of St. Paul's, to endeavour to convert him. The chaplains had no success with their arguments; but Feckenham's were brought into a narrower compass: he said, 'Either comply or burn.' Cheke could not withstand the dreadful alternative. On July 15, after a previous negotiation with Cardinal Pole, he wrote to the queen, and declared his readiness to obey her laws and other orders of religion. He afterwards not only made his solemn submission before the cardinal, but on the 4th of October made a public recantation before the queen, and after that before the whole court. Upon these mortifications his lands were restored to him, but upon condition of an exchange with the queen for others. The papists, by way of triumph, were not merely content with watching him: they obliged him to keep company generally with Catholics, and even to be present at the examinations and convictions of those they termed heretics. Remorse and vexation sate at last so heavy on Cheke's mind, that he pined away with shame and regret. He died September 13, 1557, at the age of forty-three, and was buried in the north chapel of the choir of the church of St. Alban, Wood Street, London. For the list of Sir John Cheke's works, we refer to the authorities whence the present notice of him has been drawn. Some of them are in very elegant Latin. One of his pieces, entitled 'The Hurt of Sedition, how grievous it is to a Commonwealth,' written on occasion of the insurrections in Devonshire and Norfolk in 1549, was reprinted by Dr. Gerard Langbaine of Queen's College, Oxford, in 1641, for the use and consideration of those who took arms against Charles I. Few of Sir John Cheke's works would suit the reading of the present day. Still he was one of the most learned men of his age, one of its greatest ornaments, and one of the revivers of polite literature in England. (Strype's *Life of Cheke*, 8vo. Lond. 1705; *Biogr. Brit.*, old edit., vol. ii. p. 1309; Bliss's edit. of Wood's *Athenæ Oxonienses*, vol. i. p. 241; Chalmers's *Biogr. Dict.*, vol. ix. p. 225.)

CHELIDO'NIUM, a small Papaveraceous genus, the only species of which is a glaucous rather hairy annual, with small yellow flowers, a siliquose capsule, and orange-coloured juice, not at all uncommon in waste places in this country; it is commonly called Celandine, and possesses no useful properties worth naming.

CHE'LMON, a genus of fishes. [CHÆTODON.]

CHELMSFORD, a market-town and parish in the hundred of Chelmsford, and nearly in the centre of the county of Essex, of which it is the county town, 28 miles N.E. by E. from London, on the high road to Ipswich.

Chelmsford derives its name from its situation in the vicinity of an antient ford on the river Chelmer, near its confluence with the river Cam. In the reign of Edward the Confessor, and at the time of the Norman survey, it was in the possession of the bishops of London. But it was never a place of any importance till the reign of Henry I., when Maurice, then bishop of London, built a stone bridge over the river Cam, and diverting the road which previously passed through Writtle, made Chelmsford the great thoroughfare to Suffolk and Norfolk. From this time the town has gradually increased in importance. It consists principally of three streets, which are macadamized, and partially lighted with gas. The houses are generally well built. The inhabitants are well supplied with water from a spring, called Burge's Well, about one mile from the town. The water is conducted through pipes into a reservoir, over which is a dome supported by six Doric columns. A handsome stone bridge was erected over the Cam in the latter part of the last century, connecting the town with the hamlet of Moulsham, and replacing the old bridge built by Bishop Maurice.

The shire hall is a handsome building, fronted with Portland stone. The basement, which is rustic, supports four Ionic pillars; between the pillars are three figures in basso-rilievo, of Wisdom, Justice, and Mercy. In the upper part of the building, besides two commodious courts, are a grand-jury-room and witness-room, and an assembly-room, 86 feet by 30 feet, where public balls are held at Easter and Christmas. Over the chimney-piece of the grand-jury room is a handsome bust of Thomas Gardiner Bramston, Esq., twenty years a chairman of the quarter-sessions. The old jail, built in 1779, is now only used for debtors, and the house of correction, which adjoins it, for female convicts. A new jail has lately been erected about a mile from the town, at Springfield. It is built on the radiating principle, and is capable of accommodating 272 prisoners, although it has contained many more. During the late war two extensive barracks were erected near the town, which could accommodate 4000 men, but they have recently been pulled down. The theatre is a neat building. Races take place annually at Galley-wood Common, about two miles from the town. The market-day is Friday; and fairs are held on the 12th May and 12th November, principally for horses and cattle. The assizes for the county are held here, as well as four quarter sessions and four petty sessions.

The population of Chelmsford in 1831 was 5435, of whom 2885 were females.

The living is a rectory in the jurisdiction of the commissary of Essex and Kent. The church is dedicated to St. Mary; the body has lately been rebuilt, and is a handsome building, in the later style of English architecture. The tower is square and embattled, and is surmounted by a lofty spire. The archdeacon holds his court in this church, and the wills and records are deposited in an office over the south porch. A new chapel is now being erected by subscription (August, 1836). There are two places of worship for Independents, one for the Society of Friends, and one for Wesleyan Methodists.

The free grammar-school was founded and endowed by Edward VI. The school, in common with those at Maldon and Brentwood, has an exhibition of 6*l*. per annum at Caius College, Cambridge. The management of the school is vested in four hereditary trustees. The school-house was rebuilt in 1782, by R. Benger, Esq., on the site of a more antient one built by Sir John Tyrrell.

Chelmsford has a charity school, for the maintenance, clothing, and education of fifty boys, founded in 1713, and one for twenty girls, founded in 1714, both supported by voluntary contributions; a Lancasterian, an infant, and a national school for children of both sexes; six alms-houses, founded by Sir Thomas Mildmay, were rebuilt in the end of the last century by William Mildmay, Esq. There are

also four almshouses in Baddow-lane. (*Communication from Chelmsford.*)

CHELONA'RIUM, a genus of Coleopterous insects. [ELATERIDÆ].

CHELO'NIA (Godart), a genus of Lepidopterous insects, of the section *Nocturna* (Latreille), and family *Arctiidæ* (Leach). Before we proceed with an account of this genus, which contains two of the most conspicuous and beautiful of the British moths, it may be well briefly to state the characters of the family *Arctiidæ*, as far as the diversified habit of the species will admit. The palpi are two in number, mostly three-jointed and hairy. The antennæ have a double series of pectinations; thorax large; the apex of the body generally furnished with a tuft; wings closing so as to form an angle by their junction, or folding horizontally. The males are usually larger than the females; larvæ generally very hairy, frequently furnished with numerous tufts, those on the tail and towards the head the longer.

The genus *Chelonia* is synonymous with *Arctia* of Schrank; the latter name is generally adopted by British entomologists from its priority: the term Chelonia is open to another objection, being commonly used to designate a section of tortoises.

Arctia Caja, *the large Tiger Moth*, is very common in the South of England, but apparently less so in the North. The expanded wings measure from two and a half to three inches in width; the upper wings are of a chocolate-brown colour, with numerous irregular cream-coloured markings; the under wings are scarlet, with five or six large blue-black spots; the body is also scarlet, or pinkish above, with several transverse black bands; on the under side the ground-colour is black, with pink bands: the head and thorax are brown, separated with a red ring; the legs are red at the base, and the antennæ are white.

The caterpillar of this moth is found in great abundance near London, and is frequently seen crawling on pathways: it is covered with long black hairs, and when touched will roll itself up in a ring: it feeds upon a great variety of plants, but seems most fond of lettuce, groundsel, and chickweed. The larva is found in the spring months, and turns into a pupa about June; the pupa is enclosed in a loose web of a white colour; the moth appears in the autumn.

This species is extremely variable in its imago state; we have seen specimens in which the upper wing is nearly all white, and others in which the white is almost obliterated: the spots on the under wing vary also considerably; they sometimes run one into the other so as to form a band.

Arctia Villica, the cream-spot tiger moth, is the only other well authenticated British species; it is far less abundant than the other. The upper wings are black, with about eight large cream-coloured spots; the under wings are yellowish, spotted more or less with black, and has an irregular black fascia near the margin; the abdomen is reddish, spotted with black; the head and thorax are black; the latter has two cream-coloured spots.

The caterpillar very much resembles the one last described, but has a red head and legs of the same colour; like the last it feeds upon various plants, particularly the chickweed. The moth appears about the end of June, and is rather less than the large tiger.

CHELO'NIA (Herpetology.) [TORTOISES.]

CHELO'NIANS. [TORTOISES.]

CHELO'NOBIA. [CIRRHIPEDA.]

CHELONU'RA. [TORTOISES.]

CHELSEA, formerly a village reckoned about two miles from London, but now constituting a portion of the suburbs. It is on the north bank of the Thames, in the hundred of Ossulston, Middlesex. The parish of St. Luke, Chelsea, is stated in the returns of 1831 to contain 780 statute acres and 32,371 inhabitants.

Chelsea is on a slight eminence, about fifteen feet above the Thames. The etymology of the name has raised considerable discussion; in 'Domesday' it is written Cerechede and Chelched, and Sir Thomas More, who had a house here, wrote it Chelchith. In the 16th century it began to be written Chelsey. It was once a favourite place of resort, and many of the nobility and gentry had residences here, and there were several noted taverns and public-houses with gardens, which were much frequented in the 17th and 18th centuries.

The Royal Hospital for invalid soldiers is at Chelsea. In the reign of James I., Dr. Sutcliffe, dean of Exeter, projected a college for the study of polemical divinity, which met with the king's approbation. The foundation-stone of the building was laid on May 8th, 1609. In the charter of incorporation it is termed 'King James's College at Chelsey.' But though royally patronized, and also endowed with considerable revenues by Dr. Sutcliffe, the college never flourished. It was ultimately seized by the parliament during the civil wars, and appropriated to different purposes. Charles II. gave it to the then newly-established Royal Society; but not being adapted to their use, it was restored to the king for 1300*l*. in order that the site might be occupied by the Royal Hospital.

The architect of the Royal Hospital was Sir Christopher Wren. The foundation-stone was laid on the 16th February, 1682, by the king, who was attended by a great concourse of nobility and gentry. The building was completed in 1690, at an expense, it is stated, of 150,000*l*. It is of brick, ornamented with stone quoins, cornices, pediments, and columns. The building consists of three courts, two of which are spacious quadrangles; the third, the central one, is open on the south side next the Thames. It consists of three sides of a square, ornamented with porticos and piazzas, and has a pleasing appearance. The north front is simple in its style, and consists of a centre and wings, in a straight line, with no other ornament than a plain portico. In the centre of the hospital are the chapel and the great dining-hall.

The business of the Royal Hospital at Chelsea is managed by commissioners appointed under the great seal. The establishment consists of a governor and lieutenant-governor, with various subordinate officers. There are usually upwards of 500 invalids in the hospital, who are divided into classes, and regulated by military discipline. In addition to their provision and clothing, they receive a weekly pay, varying, according to rank and service, from 8*d*. to 3*s*. 6*d*. The out-pensioners of Chelsea hospital amounted lately to upwards of 85,000, who receive from 5*d*. to 3*s*. 6*d*. per day.

There is also in Chelsea the Royal Military Asylum. The building is on an extensive plan; the foundation-stone was laid by the Duke of York in 1801, and it was completed in 1805. It is appropriated to the support and education of children (especially orphans) of soldiers and non-commissioned officers.

The Apothecaries' Company of London have a botanical garden at Chelsea. In the centre of it is a statue, by Rysbrack, of Sir Hans Sloane, from whom the company received the freehold of the ground, the consideration paid being an annual presentation of plants to the Royal Society.

The old parish church of Chelsea not being adapted to the wants of the rapidly-increasing population, a new church was erected, which was consecrated in 1824. It is a spacious and magnificent building, in the pointed style of architecture. The old church is now the parish chapel. The parish is in the diocese of London. The average gross annual income of the rector of St. Luke's, Chelsea, is 1003*l*.; he appoints the minister of the parish chapel, whose income is 300*l*.

In the educational returns of 1835, it was stated that there were forty daily schools (exclusive of the Royal Military Asylum) in Chelsea, in several of which there were endowments for educating children gratuitously, and thirty other schools, besides several not enumerated in the return. (Lysons's *Environs of London*; Faulkner's *Chelsea*.)

CHELTENHAM, a town and parish in the hundred of Cheltenham, eastern division of Gloucestershire, 88 miles W. by N. from London, 8 miles N.E. from Gloucester, and 39½ miles N. by E. from Bath. The area of the parish is 3740 acres. The town lies in the east quarter of the parish; it is rapidly increasing, particularly N.W. and S., in which directions the limits of the parish afford ample space for its extension. Cheltenham was created a parliamentary borough under the Reform Act; the borough is co-extensive with the parish, and returns one member. The town is a polling place for the eastern division of the county.

The town of Cheltenham owes its existence to its mineral springs and its pleasant situation. The Cotswold hills form an immense amphitheatre on the N.E.; and the valley in which it lies being open on the S. and W. renders its tem-

perature equable and agreeable. A saline spring was discovered here about the year 1716; some years afterwards it was inclosed, and invalids began to visit the place in summer; but it was not till near the end of the eighteenth century that the few houses constituting Cheltenham assumed the appearance of a town. The discovery of a number of additional springs favoured its increase. In 1811 the population of the parish, more than one-half of which was concentrated in the town, was 8325; in 1821 it was 13,396; and by 1831 it was 22,942, showing an increase of 9546 in ten years. The number of houses in 1821 was 2,550; in 1831, 4349, of which latter number 2067 were taxed at 10*l.* and upwards. The amount of assessed taxes paid by the entire parish (which includes the town) was, in 1830, 21,184*l.*

Cheltenham is entirely dependent on its visitors, who are generally either persons who have no occupation or invalids of the more affluent classes. This circumstance, and the additional one, that the town is of recent creation, will sufficiently account for the fact that as to the construction of the buildings and the general arrangement of the place, Cheltenham is a very agreeable residence. The town consists of one spacious street, about a mile in length, with several branching from it at right angles. The different places of public amusement, the pump-rooms, hotels, and lodging-houses, are rather superior to what are usually found in places of similar resort. There is a large gravelled promenade, called the Well Walk, about 600 feet in length, and 20 in breadth.

In addition to the parish church, which is a fine old building, there are four episcopal chapels. Two of these, in 1835, were held by the parish incumbent, whose gross average annual income is returned at 1170*l.*; the ministers of the other two chapels have 250*l.* each. The parish is in the diocese of Gloucester. In 1835 the number of schools, daily and Sunday, in Cheltenham was 52, of which two were charity schools. There is an hospital and some minor charities. There is a railroad from Cheltenham to Gloucester. A small rivulet called the Chilt, which has given name to the parish and hundred of Cheltenham, runs past the town, and falls into the Severn. There are a variety of detached houses, some of them very handsome, in the vicinity of Cheltenham, which add to the beauty of the surrounding country.

CHELTENHAM, WATERS OF. In all the springs which emerge from the sandy vale of Cheltenham, the sulphate of soda or chloride of sodium predominates; so that they belong to the class of saline waters. It is worthy of notice that most of the saline springs of Great Britain take their rise in the new red sandstone formation. Mr. Gairdner remarks however that those of Cheltenham rise in a stratum of blue clay abounding in iron pyrites, which reposes on the inferior oolite limestone; a circumstance which, according to him, furnishes an explanation of the well-known fact, that these mineral waters are strongest when first opened, and gradually decrease in strength until it becomes necessary to sink new wells in order to obtain water of the requisite strength. The specific gravity of the water of four of the springs belonging to Thompson's Spa was observed to be diminished, and two to be increased, between 1817 and 1820, to such a degree as to excite the surprise of chemists. The number of springs at present is fourteen, each of which presents some slight difference in the amount of the saline ingredients and their concomitants. The most important differences are owing to the presence of iron in some, occasionally accompanied with carbonic acid and sulphuretted hydrogen. Iodine in the proportion of about one grain to a gallon of the water exists in most of them, except the Pittville spring, in which however bromine is found in the proportion of one grain to six gallons of the water. Those in which no iron exists partake much of the nature of sea-water, and resemble it in effects when used internally; while those in which it is present are of a chalybeate nature, and, especially when the quantity of carbonic acid is considerable, can be borne by persons who cannot tolerate the simple saline waters, and can likewise be used for a much longer time without inducing debility. It is sometimes advisable to change from one kind to another, according to the state or progress of the patient; all which points will be regulated by physicians on the spot.

The persons most benefited by the Cheltenham waters are those who, after a long residence in hot climates, are affected with diseased liver; and also those who by indulgence in good living have weakened the stomach and intestines. The mucous accumulations which occur in the bowels of children subject to worms are best removed by a course of the pure saline waters, followed by the aërated chalybeate or the sulphureous chalybeate. Children subject to glandular enlargements derive much benefit from those which contain iodine along with iron.

CHEMISTRY, from χημεία (*chemeia*). According to Suidas (in voc. χημεία) it was 'the making of silver and gold,' or what is now more generally known by the name of alchemy. [ALCHEMY.] Suidas adds that Diocletian burnt all the antient books of the Egyptians on chemistry (as above explained), in order that the Egyptians might no longer be able to acquire wealth by the practice of this art, and thus be encouraged to resist the Romans. We may probably infer from this that chemèia is an Egyptian word; and if so, its resemblance to Cham or Chem, the genuine name of the country, is a confirmation of this supposition as to its origin. But whatever may have been the original meaning of the word, it no longer includes the imaginary process above-mentioned. Various definitions of its present meaning have been given, which do not materially differ; there is a collection of these definitions in the 'Supplement to the Encyclopædia Britannica,' vol. iii. p. 1. From these we shall select Dr. Black's, which is as follows: 'Chemistry is the study of the effects of heat and mixture, with a view of discovering their general and subordinate laws, and of improving the useful arts.' According to Dr. Thomson, 'the object of chemistry is to determine the constituents of bodies, and the laws which regulate the combinations and separations of the elementary particles of matter.' —*Inorganic Chemistry*, vol. i. p. 1.

It would be useless to attempt an early history of chemistry: indeed it has been asserted, and perhaps truly, that it sprang from delusion and superstition, and was at its commencement on a level with magic and astrology. The knowledge possessed of this science before the time of Constantine has been thus summed up by Bergman: 'Some general idea may be formed of the state of chemistry in those days, from the consideration of the several subjects of the art with which they seem to have had no acquaintance. Except the acetous, no trace can be discovered of any other acid. The mineral alkali (carbonate of soda) was known to them by the name of nitre; but of the vegetable alkali (potash) they knew little; of the volatile (ammonia) they were altogether ignorant. Of neutral salts they had the marine (common salt), and the ammoniac (muriate of ammonia). Of earthy salts, they had native alum only; and of the metallic salts, copperas and native green vitriol.'

Of earths, they seem to have distinguished the calcareous and argillaceous; and of stones, a very considerable number. Of inflammable simple substances, they were acquainted with sulphur, expressed oils, and oils distilled *per descensum*. But they knew no other method of extracting the essential oils than by the means of the unctuous. We find no account whatever of spirit of wine or æther.

Of the seven perfect metals hitherto known, they were acquainted with all but platinum; but they were ignorant of the imperfect. Some authors, indeed, make a distinction between tin and white lead, which was perhaps zinc, bismuth, or regulus of antimony. But it is impossible to draw any certain conclusion with respect to this; when even Pliny distinguishes between hydrargyrum and argentum vivum.

Expressions, digestions, and decoctions, were almost the only operations in their chemistry. Perhaps indeed they used some varieties of elixation, evaporation, and inspissation; as likewise of crystallization, sublimation, calcination, distillation *per descensum*, fusion, eliquation, vitrification, and fermentation. From the authorities, therefore, already cited, continues Bergman, 'it may be naturally inferred, that at the period under consideration the dawn only of chemistry had made its appearance; and that it was rather a collection of unconnected and ill-founded axioms, the result of observation and remarks, than a science established upon the broad basis of an infinite variety of experiments. At this time they were in want also of the proper instruments, and unacquainted with the necessary steps by which the principles of natural bodies can be exactly separated, collected, and properly defined. They were, therefore, without those means so necessary to the evolution of truth, and the construction of a genuine system.'—*Physical and Chemical Essays*, vol. iii. p. 91.

From the seventh to the seventeenth century, or what Bergman terms the middle age, many important facts were discovered, and several products were added to the meagre list which has been given. We shall now notice the various new preparations, which include some most important instruments of analysis. It has been mentioned that up to the present period, the acetic acid was the only one known; but several new acids were now added. Basil Valentine described the process for making what he calls oleum vitrioli, a name by which it is commonly yet known, though more correctly called sulphuric acid, from green vitriol, or sulphate of iron; and Dornæus describes another process for preparing the same acid, which, on account of the form of the vessel used in making it, was called oleum sulphuris per campanam. Nitric acid was obtained by Raymond Lully from nitre; his process was much improved by Glauber, who employed, as at the present time, sulphuric acid to decompose the nitre; by this he produced the acidum nitri fumans, or Glauber's spirit of nitre; from common salt the same chemist procured by means of sulphuric acid the spiritus salis Glauberi, since called marine, muriatic, or hydrochloric acid. Aqua regia was prepared by Hollandus, by distilling a mixture of nitre and brine; this fluid was so named on account of its power of dissolving gold, the king of metals.

Several salts and some alkaline bodies were also discovered, or more perfectly known, during this period. Geber describes the process of rendering the alkali of tartar (carbonate of potash) caustic by means of lime; he takes some notice also of the carbonate of soda, and he mentions borax. Glauber described the salt which yet bears his name, the sal mirabile Glauberi, or sulphate of soda; he described also what he terms sal secretus, which is sulphate of ammonia. Raymond Lully added some important observations: he mentions the deliquescent property of potash, and the production of the volatile alkali, or ammonia, by putrefaction; and Basil Valentine notices its evolution from sal ammoniac by the fixed alkalis.

To Crollius chemistry is indebted for the preparation, or at any rate for the description, of several saline substances: thus he terms the salt obtained by saturating vitriolic acid with the alkali of tartar tartarus vitriolatus, a name not yet quite extinct; but he does not appear to have been aware that this salt, when obtained by other processes, was similar in its nature. Crollius also mentions the salt or acid of amber; and Bartholetus, sugar of milk. The digestive salt of Sylvius was also discovered by the chemist whose name it bears: it has since been named muriate of potash: its present appellation is chloride of potassium.

Of the earths in general but little was known, and even that little, Bergman remarks, was unsupported by the principles of chemistry; clay was distinguished from sand, but not by its genuine chemical characters. Except alum, few earthy salts were known. Hollandus describes chloride of calcium under the name of sal ammonia fixus.

Among the metals, antimony was described by Basil Valentine in 1490; bismuth by Agricola in 1530; and zinc by Paracelsus also in the sixteenth century. Bergman says that Schroeder describes the process of reducing arsenic in his Pharmacopœia of 1649; but Brandt first examined it with considerable accuracy in 1733. Many metallic salts were known and examined in this period. Nitrate of silver was called magisterium argenti, vel chrystalli Dianæ; when fused it was, as now, used as a caustic, and was called by Angelo Sala lapis infernalis. Crollius gave the appellation of luna cornua to chloride of silver; he mentions also mercurius dulcis, or calomel. The binoxide of mercury prepared by nitric acid, he calls Arcanum Corallinum Paracelsi; acetate of tin, sal Jovis; and deutoxide of antimony, antimonum diaphoreticum.

Basil Valentine gives an account of acetate of lead, under the name of saccharum Saturni, and mentions the butter of antimony, or chloride; and the white precipitate obtained from it by water is called mercurium vitæ by Paracelsus, and pulvis angelicus by Algarotti. That important medicine, the tartrate of potash and antimony, was first used by Mynsicht, and called tartarum emeticum. Basil Valentine and Paracelsus observed, that muriate of ammonia combined and sublimed with some metallic oxides, producing in the case of iron a compound originally called flores martiales. It has been already noticed, that the sulphates of iron and copper were known by the names of green and blue vitriol, and their nature was understood; in this period the white vitriol, or sulphate of zinc, was made, though its composition was imperfectly elucidated.

That sulphur was known before the age we are now treating of has been already mentioned; but in this period Basil Valentine describes a solution of it in the fixed alkali, potash. Beguinus mentions it as dissolved in the volatile alkali, or ammonia, and Vigenerus suspected that it was composed of phlogiston and vitriolic acid. Basil Valentine mentions the sulphuric and nitric æthers, but very slightly; but Crollius has described distinctly the art of preparing the former. Thaddeus, Villanovanus, and Raymond Lully describe spirit of wine, and the last calls the strongest spirit alcohol, a name which it yet retains; he mentions the separation of the water by means of carbonate of potash, while Basil Valentine prefers lime for the same purpose. Raymond Lully described the aërated volatile alkali, or carbonate of ammonia. Aëriform bodies began to excite attention at this period. Van Helmont noticed some of the properties of what he calls gas sylvestre, or carbonic acid gas; he observes that it is invisible, but that it was fixed in bodies, and he attributes the phenomena of the Grotto del Cane to its presence.

From the middle till towards the end of the seventeenth century several learned societies were formed. The Academy del Cimento was founded at Florence in 1651, the Royal Society at London in 1660, and the Academy of Sciences at Paris in 1666: these societies greatly promoted and advanced physics and experimental chemistry. In 1700 the Prussian Academy also took its rise, on the model of that of France. Before, however, these societies existed, a curious work was published in 1630 by Jean Rey, a physician of Perigord; it is entitled *Sur la Recherche de la cause par laquelle Estain et le Plomb augmentent de poids quand on les calcine.* In this work, which excited little or no attention among his contemporaries, the author, without apparently making any experiments, but relying upon those of others, shows that the weight which metals acquire during calcination is derived from the union of air with the metal; he supposes that air is miscible with other bodies besides metals, and states that it may be expelled from water. Rey is generally considered as the person who first showed that air is fixed in bodies during calcination; but in support of this opinion he quotes Libavius, Cardan, and others, as having ascertained the increase of weight in lead by its conversion into a calx.

Newton himself contributed some new and general ideas on chemical phenomena to the Royal Society; he observes that sugar dissolves in water, alkalis unite with acids, metals dissolve in acids, and he inquires whether these effects are not occasioned by an attraction between their particles. Copper dissolved in aquafortis is thrown down by iron. Is not this, he inquires, because the particles of the iron have a stronger attraction for the particles of the acid than those of copper; and do not different bodies attract each other with different degrees of force?

The principal and early chemical investigators of the Royal Society were Boyle, Hooke, and Slare. The first of these was the greatest chemist and one of the most active experimenters of his age; to him the science is indebted for the introduction of tests, or re-agents, for detecting the presence of other bodies; he overturned the idea which was then commonly entertained, that the results of the operation of fire were the real elements of things. Respecting inflammable bodies, acids, alkalis, and combination, he ascertained several important facts. The air pump, which had been invented by Otto von Guericke of Magdeburg, was improved by Boyle and Hooke, and rendered an important instrument in chemical investigations respecting air they concluded, also, that air was absolutely necessary to respiration and combustion, and that a portion only of the atmosphere was employed in these processes. Hooke, indeed, arrived at the sagacious conclusion, that the part of the air necessary to the above-named processes is the same as that contained in nitre, and that during the chemical process of combustion this matter combines with the burning body.

In 1674, Mayow of Oxford published his tracts on various philosophical subjects. He seems to have been struck with the analogy subsisting between the phenomena of respiration and combustion; many of his conclusions were correct, though some of them were erroneous. He burned a candle under a bell glass, and found the residual air so deteriorated as to be incapable of continuing combustion; he then

caused a mouse to breathe a similar quantity of air, and the necessity of its renewal was soon apparent; after this, he put a mouse and a candle together under the same glass vessel, and he found that it lived only half as long as it had existed when alone under the glass. He then reversed the order of experimenting, and endeavoured to fire combustible matter in air which had been spoiled by breathing, and finding no combustion took place, he concluded that 'the nitro-aërial particles are absorbed both by the candle and the animal.' Mayow's work contains a chapter relating to the 'mutual action of salts of a contrary kind,' or to chemical combination and decomposition. A great number of new and curious facts are described in this dissertation.

Although a certain degree of similarity is observable in the views of Boyle, Hooke, and Mayow, respecting the operations of combustion and respiration, yet hitherto no theory had been attempted on a broad basis to account for chemical phenomena. But about this period, Germany, which still continued the great school of practical chemistry, gained additional credit by the labours of Becher, who was born at Spires in 1645; he studied metallurgy and mineralogy with great assiduity, and although he did not greatly add to the collection of chemical experiments, he improved the instruments of research, and rendered manipulation more simple. His opinions were, that the elements of bodies are air, water, and three earths, one of which is inflammable, another mercurial, and another fusible; these three earths, combined with water, he supposed to constitute a universal acid which is the basis of all other acids. He entertained several other notions which are now known to be utterly at variance with the results of experiment; his greatest merit was the contrivance of a theory by which all known facts were connected, and deduced from one general principle. This theory was adopted and considerably modified by Stahl, and was by him promulgated in so imposing a form as to be received by the chemical world almost universally for nearly a century. We shall therefore now give a brief account both of this author and his opinions, long known as the Stahlian theory.

George Ernest Stahl was born in the year 1660, at Anspach. The most important of his works is his 'Fundamenta Chymiæ Dogmaticæ et Experimentalis,' which is divided into a theoretical and practical part. The idea that the metals were earthy substances impregnated with an inflammable principle had been advanced by Albertus Magnus. Becher maintained the existence of this principle, not only as the cause of metallization, but likewise of combustibility; and Stahl much improved this view of the subject, and supported it by many ingenious and elaborate experiments. To the peculiar principle he gave the name of phlogiston; the doctrine was called the Stahlian theory. It raised the reputation of the author to the highest degree, and placed him in the first rank of chemical philosophers.

In explaining the phlogistic or Stahlian theory, it is to be understood that Becher and Stahl considered all combustible bodies as compounds; during combustion one of the principles is supposed to be dissipated, while the other remains. Thus when charcoal is burnt, it is entirely dissipated. Stahl therefore supposed that it was phlogiston, or the inflammable principle, nearly pure; by heating charcoal with metals which had been reduced to calces, or what were termed metallic earths, they resumed their metallic appearance and properties; therefore the metals are compounds of metallic earths and phlogiston. Again, by heating Glauber's salt, which is a compound of sulphuric acid and soda, or the fossil alkali, with charcoal, a compound of sulphur and alkali is obtained. Sulphur, therefore, was supposed to be a compound of sulphuric acid and phlogiston. Now though it had been shown by Boyle that sulphur would not burn without air, and though he had stated that sulphur was contained in the acid, and not the acid in the sulphur, yet Stahl entirely neglected, in forming his theory, the influence of air in producing the phenomena on which it was founded. The first promulgation of the theory overlooked the simple fact which had been before stated, that metals, instead of becoming lighter by being burnt, as ought to have happened, had they lost anything, actually become heavier by the operation. Those who afterwards refined upon the theory, endowed phlogiston with a principle of levity, and thus the difficulty was for a time removed, but only to be revived with redoubled force, and this difficulty, when it came to be duly appreciated, proved fatal to the theory of phlogiston.

The merits of Stahl are thus briefly stated by Sir H. Davy:—'Though misled in his general notions, few men have done more than Stahl for the progress of chemical science. His processes were, many of them, of the most beautiful and satisfactory kind: he discovered a number of properties of the caustic alkalis and metallic calces, and the nature of sulphurous acid; he reasons upon all the operations of chemistry in which the gaseous bodies are not concerned with admirable precision. He gave an axiomatic form to the science, banishing from it vague details, circumlocutions, and enigmatic descriptions, in which even Becher had too much indulged; he laboured in the spirit of the Baconian school, multiplying instances and cautiously making inductions, and appealing in all cases to experiments, which, though not of the most refined kind, were more perfect than any which preceded them.'

Several chemists of the phlogistic school followed, who contributed to the advancement of chemical science. Caspar Neumann was born at Züllichau, in Germany, in 1682. In 1724 he was appointed professor of chemistry in the Royal College of Physic at Berlin. Dr. Lewis, in the year 1759, published a translation of his works, entitled 'The Chemical Works of Caspar Neumann, M.D.,' &c. It would perhaps be difficult to mention any very important discovery contained in this work; but there are several facts, which, as facts are always valuable, must still give it a place in the library of a chemist.

John Henry Pott was born at Halberstadt, in the year 1692, and died in 1777. On the death of Neumann, in 1737, he succeeded to the chair of practical chemistry. He was a chemist of great learning and industry. The greater part of his works were collected and translated into French in 1759. In his dissertation on bismuth and zinc, he has collected the statements of all former writers, and described their properties with minute accuracy.

In the year 1709, Andrew Sigismund Margraaf was born at Berlin: he died in 1782. He made some valuable experiments on phosphorus, and on the method of extracting it from urine; he first determined the properties of alumina, demonstrated the nature of soda, and gave an easy process for preparing pure silver from its chloride. His chemical papers, down to the year 1762, were published in Paris, 1762, in two small volumes: but they do not contain all his memoirs.

In 1630 John Kunckel was born in the duchy of Schleswig; he died in 1702. In 1678 he published a treatise on phosphorus which had been originally discovered in 1669 by Brandt, an alchemist of Hamburg: all that Kunckel knew of its properties was that it was procured from urine, &c., and from this, after some years' application, he succeeded in obtaining it. The remainder of his works, excepting a treatise on glass-making, are not of great importance.

Nicholas Lemery was born at Rouen in 1645, and died in 1715. He was not the author of any very prominent discovery, but his 'System of Chemistry' contained nearly all that was known respecting the science, and the language in which it was written was more simple than that of those who preceded him. He attempted to explain the cause of earthquakes by an experiment which showed the vivid action that occurs when large quantities of iron filings and sulphur are mixed and allowed to act upon each other.

Homberg was born in 1652, in the island of Java. His papers on chemical subjects were numerous; there are however but few of them which are likely to excite much attention in the present state of the science, nor did they greatly contribute to enlarge its boundaries. The pyrophorus known by his name was prepared by mixing human fæces and alum, and heating the mixture to redness till it became a carbonaceous powder. It has been since found that carbonaceous matter in preferable forms may be used with the alum, as honey, flour, or gum. The nature of the combustion of this pyrophorus was first explained by Davy.

Henry Louis Duhamel was born at Paris in 1700, and died in 1781. He published many papers on chemical subjects. His chief contribution to the science was that of pointing out the difference between potash and soda, which had been formerly confounded.

Peter Joseph Macquer was born at Paris in 1718, and died in 1784. He first pointed out the existence of arsenic acid and the nature of several of the salts which it forms with bases; he afterwards published some important experiments on Prussian blue, and such as tended to the discovery of the nature of its colouring ingredient. He made several

experiments on platinum, though without any very beneficial results to chemistry. He was the author of a Chemical Dictionary, which has been translated into many languages.

We have mentioned most of the chemists who contributed valuable additions to the science before the introduction of pneumatic chemistry. To speak of them all would require a volume. We now therefore approach, or rather commence a most important æra in the history of chemical research and discovery. Hitherto, except what had been done by Rey, Mayow, and Boyle, the effects produced by aëriform bodies, and their relation to the phenomena of chemistry, had almost entirely escaped observation: or at any rate they had been but very slightly and imperfectly considered, as shown with respect to the increase of weight which occurs during the calcination of metals, and which was rather attributed to a principle of levity in the phlogiston lost by them, than the acquisition of weight from the air.

Dr. Hales was born 1677, and died in 1761. About 1724 he recommenced the examination of aëriform bodies which had previously engaged the above-named philosophers; he attempted to ascertain the chemical relations subsisting between air and other bodies, and to determine the circumstances under which air is absorbed or extricated by natural processes. The results which he obtained were curious and important; but, owing to a fundamental error in his ideas, he drew but few inferences which contributed to elucidate the intricate and hitherto imperfectly explored paths of the science. The idea which he entertained of one elementary principle as constituting elastic matter modified by the effluvia of fluid or solid bodies, greatly aided the formation of those more just views which later and more refined experiments have since contributed to unfold. He subjected a vast number of bodies to the action of heat, and obtained gaseous products from them; thus he found that the air which he obtained from wood was fatal to animals; from nitre he procured nearly 200 times its volume of air, and from coal one third of its weight. He found that oil of vitriol, when poured on iron filings, produced very little air, but that the addition of water occasioned its evolution in large quantity. In no case, however, were the gaseous products thus procured examined with the attention which might have been expected from the novelty of the results. He also found that when phosphorus was burnt in air, the quantity of air was diminished, and white fumes were produced; but he neither examined the residual air, nor did he inquire into the nature of the white fumes resulting from the combustion of the phosphorus.

The experiments contained in his Statical Essays, published in 1727, were made to prove the transpiration of trees, and also the force with which they imbibe moisture. These experiments are not however immediately connected with our present subject.

In 1718 Geoffroy published tables of affinity; and although the affinity has since been discovered to be modified by a variety of circumstances, yet these tables have certainly been of use.

Dr. Black, Professor of Chemistry in Edinburgh, published, in 1756, his researches on calcareous, magnesian, and alkaline substances. He showed that there existed in these substances an aëriform body, possessing chemical and physical properties, perfectly distinct from the air of the atmosphere: he proved that marble and chalk contained this body capable of an aëriform existence, and that its presence constituted the difference between them and quicklime; he showed also, that it was capable of being expelled from earthy and alkaline substances by the action of an acid, and when the air thus set free was collected and examined, he found it to possess the properties of a weak acid.

Great opposition was offered to the new and important conclusions which were promulgated by Dr. Black: thus, among others, Meyer, a German chemist, attempted to prove that limestone became caustic by combining in the fire with a peculiar substance, and not, as Dr. Black had proved, by losing aëriform matter. The loss of weight which the limestone suffered was however almost a sufficient proof of the accuracy of Dr. Black's views; and, in a few years from the date of their promulgation, the opinions of Black were universally admitted to be correct.

The existence of an elastic fluid different from that of the atmosphere, greatly excited the attention of experimentalists, and they were soon led to inquire whether others might not also exist. The various gases obtained by Hales were now regarded with different views; and, before many more years had elapsed, numerous and peculiar aëriform bodies were discovered by various processes. Dr. Black's experiments on what he termed latent heat are remarkable for their simplicity, and the precision of the inferences drawn from them.

Mr. Watt derived great advantage from these in his celebrated improvements on the steam-engine.

About the year 1765, Mr. Cavendish (who was born in 1731, and died in 1810) discovered and described the properties of inflammable air, since called hydrogen gas; and he invented an apparatus for collecting and examining elastic fluids, which, although extremely simple, has been completely set aside by the more convenient methods proposed by Dr. Priestley. He ascertained the relative densities of fixed air, inflammable air, and common air.

Having stated the general properties of hydrogen gas, he shows that different metals, when dissolved in similar portions of the same acid, afford different quantities of this gas: that zinc yielded more than iron, and iron more than tin, facts which are perfectly consistent with and explained by the doctrine of equivalents; he ascertained the exact proportions of the constituent gases of the atmosphere. His most celebrated discoveries were however those of the composition of water and nitric acid; and he first determined the freezing point of mercury.

His character, as a philosopher, is thus sketched by Sir H. Davy:—'Cavendish was possessed of a minute knowledge of most of the departments of natural philosophy: he carried into his chemical researches a delicacy and precision which have never been exceeded: possessing depth and extent of mathematical knowledge, he reasoned with the caution of a geometer upon the results of his experiments and it may be said of him, what perhaps can scarcely be said of any other person, that whatever he accomplished was perfect at the moment of its production. His processes were all of a finished nature; executed by the hand of a master, they required no correction; the accuracy and beauty of his early labours even, have remained unimpaired amidst the progress of discovery, and their merits have been illustrated by discussion, and exalted by time.'

The important discoveries of Dr. Joseph Priestley next claim attention. He was born in 1733, and died in 1804. No person ever commenced a career of discovery under circumstances less likely to insure success than Dr. Priestley. He was but imperfectly acquainted with chemical science, he had but little leisure, his apparatus was very deficient, he had frequently to invent new modes of operating, and with means which were extremely scanty. All these difficulties he surmounted with indefatigable industry and ingenuity, and to him we owe the most important discoveries which have ever been made.

Pneumatic chemistry had, to a certain extent, been studied, as already shown, by Boyle, Mayow, Hales, and especially by Black and Cavendish, when Dr. Priestley began his experiments. His first memoir was published in 1772, and was on the method of impregnating water with carbonic acid gas. This paper was the result of his accidentally living near a brew-house, in which he had made experiments on the carbonic acid evolved during fermentation. Among the gaseous products which Dr. Hales obtained was that now called nitric oxide, but he did not inquire into its properties. It was again discovered, and minutely examined by Dr. Priestley, who applied it to the purposes of eudiometry, a branch of the science which may almost be said to have originated with him, and in consequence of this discovery.

Azotic gas had undoubtedly been obtained, but was not examined by Hauksbee when he passed atmospheric air over ignited metals; Dr. Rutherford also noticed it about 1772, and to him the priority of the discovery is generally assigned. It appears however that Dr. Priestley had obtained it, and noticed its properties at least as early, and perhaps sooner, for he gives an account of it in the *Philosophical Transactions* for that year.

His greatest discovery was that of what he called dephlogisticated air, now called oxygen gas. This important accession to chemical science was made on the 1st of August, 1774. He procured it by strongly heating red oxide of mercury, formed by the action of heat and air upon the metal, and collecting the gas which was evolved from it. The consequences of this discovery would require a volume

for description; it has served as the basis for all that is known respecting the nature of the atmosphere, water, acids, and alkalis; and the nature of combustion has been greatly illustrated by it.

Sulphurous acid, fluosilicic acid, muriatic acid, and ammonia were first made known in the gaseous state by Dr. Priestley; he discovered nitrous oxide gas, and first obtained carbonic oxide gas, the nature of which however he mistook. He did not discover hydrogen gas, but his experiments upon it are interesting; he pointed out the existence of carburetted hydrogen gas, though he did not make many experiments upon it.

The action of electricity on various compound gases was examined by him, and he showed that an acid is formed when sparks are passed through a confined portion of atmospheric air; this fact served as the basis of Cavendish's discovery of the composition of nitric acid. In the same way the increase of bulk which he found to take place by the action of the same agent on ammoniacal gas led Berthollet to determine the nature of it. His experiments on the amelioration of atmospheric air by the process of vegetation are highly curious, and have been repeated and confirmed by subsequent investigations. His work entitled 'Experiments and Observations on different kinds of Air' contains a vast number of experiments, from which various inferences might be drawn, which he seems, in his rapid career of discovery, himself to have overlooked: such are those just mentioned; and the composition of atmospheric air and water might be added to the list.

His additions to the means previously known for experimenting on gaseous bodies have afforded the greatest facilities to those who have followed him: such are the invention of the pneumatic trough, and the substitution of mercury for water in those gases which are soluble in the latter fluid. To conclude with the observations of Sir H. Davy: 'Chemistry owes to him some of her most important instruments of research, and many of her most useful combinations; and no single person ever discovered so many new and curious substances.'

The works of Torbern Bergman (born in 1735, died in 1784) have been collected and translated into English. The first paper which he published was in 1774, 'On the Aërial Acid,' now called carbonic acid gas. If the contents of this paper be compared with the previous one of Cavendish on the same subject, it will be seen that the latter had anticipated Bergman on many of the more important facts. No notice however is taken of Cavendish's experiments in it.

He afterwards published papers on the 'Analyses of Mineral Waters,' and though the methods which he adopted are by no means accurate, they were preferable to any which had been previously used.

He published a paper on oxalic acid, of which however the discovery is said to be due to Scheele. It will be scarcely possible to enumerate even the various papers of Bergman, and much less to give an analysis of their contents. His 'Essay on Electric Attractions' is however a work of importance, and requires a more detailed notice. The intention of the author was to point out the nature of chemical affinity, and to account for the anomalies which that complicated subject appears to present. He adopts it as a principle that chemical combination is the result of an absolute force. Berthollet attempted to show that this conclusion is erroneous, and though it must be admitted that there are various circumstances which modify the action of this power, we are not so nearly without a guide to just conclusions as the experiments and opinions of Berthollet would lead us to admit.

Bergman published tables in fifty-nine columns, in which he showed the relative attraction of bodies, or what he terms elective affinity. As the order of decomposition often varies, according as it is made in the dry way or the moist, each of the fifty-nine columns was divided into two; the first exhibiting the order of decompositions in the moist, and the second in the dry way: he also stated various cases of double decomposition. These tables are constructed upon the now well-known principle, that any substance, whether acid, alkali, or metallic oxide, being placed at the head of a column, and others under it, such substance has the greatest affinity for that next to it, and for the rest, according to the nearness of their place.

It has been already observed that Bergman's processes for analyzing mineral waters were more correct than any which had been previously adopted, and although his experiments on the analysis of precious stones are far removed from perfection, yet they possess the rudiments of the methods which are now adopted. He first proposed the analysing of minerals by combining them with the fixed alkalis, by which they were rendered partially soluble in water, and totally so either in that fluid or in an acid.

He found fulminating gold to contain ammonia, and he explains the detonation to arise from the sudden decomposition of that gaseous body.

The discoveries which next claim attention are those of Charles William Scheele, who was born at Stralsund in 1742, and died in 1786. Like Priestley, Scheele began his experiments under very unfavourable circumstances with respect to apparatus and the means of procuring it.

Scheele, observing that air was requisite to combustion, subjected it to analysis. He found that certain substances, especially what was then termed liver of sulphur, and now sulphuret of potassium, when exposed to a given bulk of air, diminished it to about four-fifths of the original quantity; he found also that the flame of burning sulphur and of hydrogen gas produced the same effect. Without any acquaintance with what Priestley had previously done, he obtained, by various processes, oxygen gas, which he termed empyreal air; and he showed that this air was absorbed by liver of sulphur; and that upon adding fresh empyreal air to that left unacted upon by it atmospheric air was reproduced.

His experiments on the nature of air were followed by some on heat and light, and he gave the name of radiant heat to that portion of it which emanates from hot bodies, and, as he found, in right lines. He observed the blackening effect which is produced by the sun's rays on chloride of silver, and that the violet rays produce this effect most speedily. He made experiments on Homberg's pyrophorus, and showed that ammonia alum is incapable of forming it. In his dissertation on manganese he made the discovery of chlorine gas, or, as he called it, dephlogisticated marine acid. His essays on fluor spar contained several valuable facts, but he committed the error of supposing that the silica which he obtained in his operations, from the retort, was formed by the combination of water and fluoric acid. He pointed out the difference between plumbago and sulphuret of molybden, and he first described the molybdic and arsenic acids, and formed a compound of the latter with oxide of copper, or arsenite of copper, which has since been extensively used as a pigment, under the name of Scheele's or mineral green. He made experiments on milk, and sugar of milk; and the acid of the sugar of milk, now called lactic acid, was noticed by him. He gave a method of obtaining citric, tartaric, gallic, and some other vegetable acids; and published essays on tungsten, æther, calomel, benzoic acid, and urinary calculi, all of which contain valuable information.

He particularly examined the colouring matter of Prussian blue, which was nearly his last contribution to chemical science. The subject was one of great difficulty, considering that it involves the agency of azote, which had not long been discovered. He treats the subject however with his usual sagacity, and having obtained what is now called prussic or hydrocyanic acid, he has stated several of its properties. Besides the discoveries which have been enumerated, it is to Scheele that we are indebted for the first knowledge of barytes and of the characters of manganese.

Antoine Laurent Lavoisier was born in Paris in 1743, and died a victim to the revolution in 1794. Although the original discoveries of Lavoisier have less merit than those of Priestley and Scheele, yet his contributions to the science are numerous and important, especially as to what regards its theory. His 'Elémens de Chimie' were published in 1789. In this work he considers heat as a subtile fluid or a material substance, which he calls caloric. He argues that the different forms of matter depend in general upon the quantity of caloric which they contain. His analysis of atmospheric air, though conducted perhaps on more philosophical principles, does not offer so great precision of results as those deducible from the very simple experiment of Priestley; but it must be admitted that they had the merit of settling the question as to the nature of the atmosphere.

Van Helmont, and after him Macquer, had employed the term gas to denote all elastic fluids which differ from atmospheric air. This word Lavoisier also adopted: and as he found that the portion of the atmosphere which supported

animal life also entered into the composition of acids, he called it oxygen gas; the other constituent of the air he called, from its fatal effects upon animal life, azotic gas; by this name it is yet designated by many chemists, while others prefer that of nitrogen, derived from its forming a part of nitric acid.

Lavoisier and his coadjutors effected various improvements in chemical nomenclature, most of which remain in use at present, but some alterations and additions have been rendered necessary by the highly-cultivated state of the science. The nature of the diamond had excited the attention of the Florentine Academy as early as 1690; the subject was resumed by Lavoisier, who proved, that when air was excluded it underwent no change; on the other hand he showed, that by burning it in oxygen gas carbonic acid was formed, and hence he argued, what is indeed now generally admitted, that the diamond, in its chemical nature, is similar to common charcoal.

In adverting to the solution of metals in acids, he notices the necessity of their oxidizement previously to it, and hence he argues the probability that the alkaline earths are metallic oxides, the oxygen serving as a bond of union between them and the acids: this sagacious remark has been verified by the discoveries of Davy. In his additional observations on the combinations of oxygen, he mentions the conditions necessary for its union with different bodies; the compounds arising from the union of various combustible bodies are also treated of, and those of the acids and some other compound substances. Sir H. Davy remarks, that 'Lavoisier must be regarded as one of the most sagacious of the chemical philosophers of the last century; indeed, except Cavendish, there is no other inquirer who can be compared to him for precision of logic, extent of view, and sagacity of induction. His discoveries were few, but he reasoned with extraordinary correctness upon the labours of others. He introduced weight and measure, and strict accuracy of manipulation into all chemical processes. His mind was unbiassed by prejudices; his combinations were of the most philosophical nature; and in his investigations upon ponderable substances he has entered the true path of experiment with cautious steps, following just analogies, and measuring hypotheses by their simple relation to facts.'

It is, however, matter of history, and ought not to be suppressed, that Lavoisier was not content merely to employ the discoveries of others, even without acknowledgment, but that he made a distinct claim to the discovery of oxygen, which Dr. Priestley has most satisfactorily refuted, by asserting, what might have been contradicted, but which was not, that he had mentioned this gas and the mode of procuring it at the table of M. Lavoisier himself. He makes scarcely any, if any, acknowledgment of the labours of his predecessors, and his friends have claimed for him the discovery of azotic gas, previously described by Priestley and Rutherford.

Claude Louis Berthollet (born in 1748, died in 1822) was the author of more than eighty memoirs on chemical subjects. His earlier papers on sulphurous acid, ammonia, and the decomposition of nitre, were published while he was yet a believer in the phlogistic theory, which he zealously defended, but afterwards renounced. One of his most important contributions to chemistry was that of demonstrating, in 1785, the nature and properties of the elements of ammonia. About the same time he made his experiments on the dephlogisticated marine acid of Scheele, which, from experiments well calculated to give rise to the opinion, he supposed to be a compound of muriatic acid and oxygen, and it was called oxygenized muriatic acid. These views, in consequence chiefly of the experiments of Davy, have been shown to be erroneous, and this gas is now called chlorine, and is admitted to have hitherto resisted all attempts at decomposition. It was stated by Scheele, in his experiments on this gaseous body, that among other properties which it possessed, was that of destroying vegetable colouring matter. In consequence of this remark Berthollet applied it to the purpose of bleaching, in which it is now most extensively and almost universally used.

The experiments which Berthollet made on prussic acid and its compounds advanced but did not complete our knowledge respecting those bodies. In examining the properties of sulphuretted hydrogen, he observed that it possessed acid properties; it was not however by the French chemists admitted to the class of acids, because it was inconsistent with the theory just adopted, that all acids must contain oxygen. Berthollet also discovered fulminating silver, and first employed alcohol as a solvent for obtaining potash and soda in a pure state.

In 1803 Berthollet published a work entitled 'Chemical Statics,' the object of which was to controvert the opinions of Bergman on chemical affinity; but although he pointed out some difficulties attendant upon them, they were by no means refuted. In this work Berthollet also maintained the opinion that quantity may be made to overcome the force of the chemical affinity existing between bodies. There were however several points of the argument which he neglected, or with which he was unacquainted; indeed, at the period at which he wrote, the doctrine of definite proportions had not been promulgated,—a doctrine which will explain many of the apparent anomalies that occurred to Berthollet. Indeed, in a discussion with Proust, in which the latter had decidedly the advantage, Berthollet asserted that bodies were capable of uniting with each other in all proportions. But whatever may have been the erroneous views of Berthollet in some particular cases, chemistry is greatly indebted to him for many valuable discoveries and minor details; and the application of the bleaching power of chlorine is a practical scientific improvement which has, for its extent and usefulness, scarcely been equalled, except in the construction of the steam-engine.

Louis Bernard Guyton de Morveau was born at Dijon in 1737, and died in 1816. Although the publications of this chemist were very numerous, and contributed much to the extension of the science, yet he was not the author of any very prominent discovery. His papers are scattered through the 'Dijon Mémoires,' 'Journal de Physique,' and 'Annales de Chimie.' There are however some circumstances connected with the history of chemistry, in which his participation must not be overlooked. In 1787, in conjunction with Lavoisier, Berthollet, and Fourcroy, he published a work in one volume, 8vo., entitled 'Méthode de Nomenclature Chimique,' in which the important improvements projected and subsequently adopted, are detailed. In 1801 he published a tract, 'Des Moyens de désinfecter l'Air.' For this purpose he used various acids, and especially muriatic acid; but he afterwards adopted chlorine, which is now so generally used for the same purpose. The application of these disinfectants was made in 1782, although the history of it was not given to the public till the year abovementioned. He was the author of a considerable portion of the chemical articles in the 'Encyclopédie Méthodique;' and that on 'Acid' has been justly commended for its accuracy, both as to experimental and historical details.

Antoine François de Fourcroy was born at Paris in 1755, and died in 1809. This chemist was more celebrated as one of the first authors, if not the earliest, of a treatise on chemistry and as a lecturer, than as a promulgator of any very great discovery. His chemical work went through several editions, and is in general written with perspicuity and attention to the history of the science: his 'Philosophy of Chemistry' is also a work of considerable merit. As a discoverer, he is to be mentioned as having first shown that the salts of ammonia and magnesia have a tendency to form double salts; and he particularly pointed out the ammoniaco-magnesian phosphate. He ascertained that biliary calculi resemble spermaceti in their nature, and that muscular flesh is convertible into a fatty substance which he has named adipocire. He published several papers in conjunction with Vauquelin, but what belongs to each it is impossible to tell. It has been supposed that the facts were principally ascertained by Vauquelin, and the account of them written by Fourcroy: among other papers, they published one giving a method of obtaining barytes from the nitrate by heat; they discovered also the existence of phosphate of magnesia in bones, and of phosphorus in the brain and in the melts of fishes.

It has been mentioned that the analysis of precious stones had, though imperfectly, been attempted by Bergman: this department of chemistry received vast accessions from the labours of Martin Henry Klaproth, who was born at Wernigerode in 1743, and died in 1817. This chemist introduced into the art of analysis more improvements than we can even allow room to detail. The vast progress which he made in the science will be fully estimated, when it is known that at the time at which he commenced his labours the correct analysis of scarcely any minerals was known, and that he analyzed nearly two hundred with so much accuracy that his results have been generally confirmed, and the simplicity of his method of operation is greatly to be commended

In 1789 he discovered a new metal in a mineral called pechblende, to which he gave the name of uranium; and in the same year in analyzing the zircon he found a new earth, which he called zirconia, and which has since been shown by Berzelius to be a metallic oxide. In 1795 he found the same substance in the hyacinth; in this year he also found in the red schorl the same metallic oxide which Gregor had previously met with and called menachine; Klaproth named it titanium, and this appellation is now generally employed. Apparently ignorant of the fact that strontia had been previously described as a peculiar earth, he in 1793 showed the difference between it and barytes, they having been confounded in Germany up to that time. In 1798 he gave an account of tellurium as a new metal, but it had been before noticed by Müller. In 1804 he described a new substance, which he called ochroita. Berzelius and Hisinger considered it a metallic oxide, and called the metal cerium. Besides these more important contributions to science, he made many discoveries of minor importance, which may be found in his 'Analyses,' of which two volumes have been published and translated into English. Besides minerals, there will be found analyses of some mineral waters, an account of the effects produced by intense heat upon various minerals, and the details of the methods of analysis, which are extremely valuable and instructive, both as to the nature and method of employing various chemical re-agents.

M. Vauquelin was one of the most distinguished analysts of the present century. He was born in Normandy, in what year we know not: but he died in 1829. His analyses were not confined to any particular class of bodies, and he published more and perhaps included a greater variety in his operations than any other chemist; his researches included the three kingdoms of nature, but his greatest discoveries were in the mineral. In the emerald and beryl he found a new earth, to which, on account of the sweetness of the salts which it formed with acids, he gave the name of glucina; but his discovery of chromium, in the state of chromic acid, in the red lead of Siberia, was an æra in chemical history. Originally met with in a scarce and valuable mineral, it has since been found in various parts of the earth combined with iron, and in immense quantity; it is largely employed for various uses; in the state of oxide for giving a green to porcelain; in that of acid, combined with oxide of lead, it forms both a fine yellow and orange chromate, which is used in painting and calico printing. It would be in vain to attempt an analysis of Vauquelin's various papers; they are chiefly to be found in the 'Annales de Chimie,' and will amply repay perusal. He was also author of a work entitled, 'Manuel de l'Essayeur,' which he was particularly competent to write, not merely on account of his great skill, but also as being assay-master of the mint.

Mr. Smithson Tennant was born in Yorkshire in 1761, and died in 1814. In 1791 he made an experiment, which confirmed the previous statement of Lavoisier as to the composition of carbonic acid. He effected this by passing phosphorus through red-hot carbonate of lime, and he found that the phosphorus was acidified at the expense of the oxygen of the carbonic acid, and that while phosphoric acid was formed charcoal was developed. In 1796 he heated the diamond with nitrate of potash in a gold tube, and he found that the diamond, by combining with the oxygen of the nitric acid, was converted into carbonic acid, and this combined with the potash of the decomposed nitrate to form carbonate of potash. He observed in 1799 that certain limestones, on account of the carbonate of magnesia which they contain, are hurtful to vegetation; he examined the substance known by the name of emery in 1802, and showed that it is a variety of corundum; and in 1804 he discovered two new metals, viz., osmium and iridium, in the grains of native platinum.

John Gottlieb Gahn (born in 1745 in South Helsingland, died in 1818) was the pupil of Bergman. He was particularly skilled in the use of the blow-pipe; and he ascertained that bone is a compound of phosphoric acid and lime. He proved the metallic nature of manganese, and stated the properties of the metal.

The Rev. William Gregor was born in 1762, and died in 1817. In the year 1791 he discovered a peculiar substance in a black sand, found in the parish of Menaccan in Cornwall. This substance was afterwards detected by Klaproth, and by him proved to be a metallic oxide, to the metal contained in which he gave the name of titanium. In 1805 Mr. Gregor described a hydrate of alumina found in Cornwall; he analyzed the uranite, and also the arseniate of lead.

Dr. William Hyde Wollaston was born about 1767, and died in 1828. His knowledge was not confined to chemistry: he made acoustics and more particularly optics also his study. His first chemical paper on urinary calculi contained much new information on this subject; he showed that the mulberry calculus is oxalate of lime mixed with animal matter; he pointed out a new calculus, which he named cystic oxide, the nature of the triple phosphate, and of the chalk stones formed on the joints of gouty persons. He discovered two new metals in the grains of native platinum, viz., palladium and rhodium; he showed that oxalic acid and potash combine in three different proportions, forming the oxalate, binoxalate, and quadroxalate of that alkali. He pointed out the nature of some small copper-coloured crystals found in the slag of an iron furnace, proving by a series of experiments, in a paper which is a perfect model of conciseness and accuracy, that they were metallic titanium. He perfected the method of rendering platinum available for the purposes of chemistry and the chemical arts, and his 'Scale of Chemical Equivalents' more effectually elucidated and extended the doctrine of definite proportions than all that had been previously done both by theory and practice. He first showed that the evolution of voltaic electricity is dependent upon chemical action, a fact which has been since amply and ably illustrated by Faraday. His 'Reflective Goniometer' has given to crystallography all the minute accuracy which it previously stood in need of; for it showed that three substances, viz., the carbonate of iron, lime, and magnesia, which were previously supposed to crystallize in rhomboids measuring the same angles, had all different angles. His paper on the finite extent of the atmosphere is replete with curious and acute observations; and he invented some optical instruments, which we need not here particularly describe.

Humphry Davy was born at Penzance, in Cornwall, in 1778, and died in 1829. To the researches and discoveries of this justly celebrated chemist it will be impossible to do justice in the space to which we are confined. His first contributions to chemical science were published in 1799, in a work edited by Dr. Beddoes, entitled 'Contributions to Physical and Medical Knowledge.' The first paper is 'An Essay on Heat, Light, and the Combinations of Light,' and the second 'On the Generation of Phos-oxygen (oxygen gas), and on the Causes of the Colours of Organic Beings;' these, although stamped with the mark of genius, are more remarkable for the speculative than experimental nature of their contents. In 1800 he published a work, entitled 'Researches, Chemical and Philosophical; chiefly concerning Nitrous Oxide, or Dephlogisticated Nitrous Air, and its Respiration.' In this, which is a work of high merit, he details the effects produced by the respiration of nitrous oxide both on himself and others. The very high reputation which he had acquired by this work was greatly increased by his paper in the 'Philosophical Transactions' for 1807, entitled, 'On some Chemical Agencies of Electricity.' In this paper he showed that the acid and alkali which had before been observed to be developed by galvanic agency were derived from the decomposition of some previously existing salt, and were not formed by the electric action. He arrived at the conclusion, from the numerous experiments described in this paper, that all bodies possessing chemical affinity for each other are in different electrical states, and that the degree of the affinity is proportional to their intensity. By the agency of voltaic electricity he decomposed the alkalis, potash and soda, and obtained from them metallic bases, to which he gave the names of potassium and sodium; he succeeded also in separating metallic bases from lime, barytes, strontia, and lithia; he was not however equally successful in decomposing those earths which have no alkaline properties, as alumina, glucina, yttria, and zirconia, though these have since yielded to other modes of decomposition. In 1807 he also discovered boron, the base of boracic acid.

In 1811 Davy read a paper to the Royal Society, in which he showed that what was called oxymuriatic acid by Berthollet, instead of being, as he supposed, a compound of oxygen and muriatic acid, was, in fact, an undecomposed substance, and therefore must be regarded as an element, and he gave to it the name of chlorine from its green colour. These views, though at first strongly opposed by Berthollet and Dr. Murray, are now universally adopted. In the following years he contributed various important papers to the

Royal Society, and among them on the following subjects:—on a compound of chlorine and oxygen; on chloride of azote; on iodine; the combustion of the diamond; on the salts called hyperoxymuriatic; on fire-damp, and the means of preventing accidents in mines; and his invention of the safety lamp. In succeeding years he published various papers on electricity, electro-magnetism, and on a method of preventing the corrosion of copper sheathing; this plan, though based on perfectly scientific principles, failed in its object from the very unexpected cause of its being rendered foul. His last paper was in 1819, on the electricity of the torpedo.

In 1812 Davy published the first part of the 'Elements of Chemical Philosophy,' a work which was never completed. It embodied the results of his discoveries, and an account of certain views of the author up to the time in which it appeared. This work bears occasional marks of haste, yet it contains evidence of its emanating from a genius of the highest order.

In concluding this brief sketch, it is hardly necessary to remark that the discoveries alluded to in it placed their author at the head of the science which he illustrated, not merely in England but in Europe; and his fame will rest on the durable base of experimental discovery and unrivalled talent for generalization.

In giving a history of chemistry, it is impossible not to notice the doctrine of definite proportions, or the atomic theory; under which head we have entered pretty fully into the history of its discovery, and mentioned the contributors to its development, whether deceased or living. In that article the discoveries and labours of Wenzel, Dr. Higgins, Mr. Higgins, Richter, Proust, Dalton, Wollaston, Berzelius, Gay-Lussac, Dr. Prout, and Faraday, are detailed so amply as to require no further notice here.

There are still some other subjects which it is necessary to mention, though we cannot allude to all the discoveries which their respective authors have made. In 1803, Sertuerner, a German apothecary, discovered in opium the first of a new class of bodies, or the vegetable alkalis; but this discovery excited little notice, till the author published a second paper in 1816; this alkali is morphia. Since this time numerous others have been found; they are all of them very active substances, and frequently poisonous. Thus the different kinds of cinchona have yielded two alkalis, quina and cinchonia, to which their virtues are owing: these were discovered by Pelletier and Caventou, in 1820. It has been found that many of the most active vegetable substances, such as hellebore, ipecacuanha, colchicum, and many others, contain an alkali. That those alkalis should not have been sooner discovered is readily accounted for by their existing combined with acids, so as not to exhibit any alkaline properties.

In 1812, iodine, a peculiar elementary substance, was discovered by M. Courtois, of Paris. The nature of this body was made the subject of numerous experiments both by Davy and Gay-Lussac. Its discovery served the purpose of illustrating and confirming the new views of Davy as to the simple nature of chlorine.

In 1818 Berzelius discovered a peculiar inflammable elementary body, to which he gave the name of selenium. In 1824 he obtained the metallic bases of silica and zirconia; and in 1829 he found a new metal, to which he gave the name of thorium. In 1818 Stromeyer discovered cadmium, a new metal; and in the same year lithium was discovered by Arfwedson; Bussy obtained magnesium from its oxide in 1829, and in 1830 Sefstrom discovered the metal vanadium.

In 1823 Mr. Faraday showed that various gases, which had previously resisted condensation, might be rendered fluid; we particularly mention this important acquisition to chemical science, because unjustifiable attempts have been made to transfer the honour of it to Sir H. Davy. Eight compound gases were rendered fluid, but chlorine is the only elementary one which yielded to the same treatment. If our space allowed, we should be happy to give a more extended view of the important discoveries of Mr. Faraday in electro-chemical and electro-magnetical science, as well as to notice his other important contributions to chemical philosophy.

In 1826 Balard made known the new elementary body bromine, which is remarkable as being the only elementary fluid except mercury.

We cannot better conclude this slight sketch of the progress of chemistry than by adopting the words of Sir H. Davy on a similar occasion:—'To dwell more minutely upon the particular merits of the chemical philosophers of the present age will be a grateful labour for some future historian of chemistry; but for a contemporary writer it would be indelicate to assume the right of arbitrator, even where praise only can be bestowed.'

CHEMNITZ, a town in Saxony, the capital of the Erzgebirg circle, is situated at the foot of the Erzgebürge, in a plain which extends about ten miles in every direction. It is in 50° 50′ N. lat., and 17° 55′ E. long., and about 976 feet above the level of the Baltic. Chemnitz is one of the most industrious towns in Germany. In no place indeed have all the English improvements been introduced with such care and skill as in Chemnitz. The number of persons employed in weaving exceeds 2000. There are twelve manufactories for printing cotton goods, and some in which the yarn is dyed red like Turkish yarn. The woollen manufactures, which were formerly very considerable, have much decreased in the last fifty years; but in the town as well as in its neighbourhood there are many stocking manufactures. Chemnitz carries on a considerable trade, being situated where the road between Prag in Bohemia and Leipzig and that which unites Bavaria with Dresden cross one another. The town contains about 16,000 inhabitants, and is well built; the streets are spacious and mostly straight, and many of its houses look more like palaces than dwelling-houses. It is remarkable for the great cleanliness of its streets, and is lighted with lamps. The public edifices are in a good style, but none of them particularly distinguished.

CHE'NNIUM, a genus of Coleopterous insects. [PSELAPHUS.]

CHENOPODIA'CEÆ, a natural order of exogens, consisting of numerous species, used either for culinary purposes or for the manufacture of soda. They are apetalous plants, with minute green herbaceous flowers, a small number of stamens, which are opposite the segments of the calyx, and a one-celled membranous fruit, containing one single erect seed or a very small number. The leaves are soft and



[Blitum virgatum.]

a, angle of the petiole, showing the peduncle; *b*, flower; *c*, flower deprived of its calyx, showing the ovary, surmounted by three pistils; *d*, calyx; *e*, fruit imbedded in the succulent calyx; *f*, *g*, fruit separated from the calyx; *h*, horizontal section of fruit; *i*, vertical do.; *k*, embryo. All these figures, excepting *a*, magnified in various degrees.

rather succulent, without any trace of stipules. Most of them are found in the cold and temperate parts of the world. They differ from Polygonaceæ and Urticaceæ in the want of stipules, and from Amarantaceæ in their flowers not being coloured and enveloped in membranous bracts. Spinach, beet, orach, and other spinaceous plants, belong to this order, in which no deleterious species has been discovered.

CHENOPO'DIUM, the genus after which the last-mentioned order has been named, consists of weedy plants, common on dunghills and in waste places, and known by the strange names of Fat-hen (*Ch. album*), Good King Henry (*Chenopodium Bonus Henricus*), &c. They are generally insipid plants, whose leaves and young shoots may be eaten as spinach, but which have no particular merit. In this genus is however found the celebrated Quinoa of Peru (*Chenopodium Quinoa*). This plant, whose seeds are said to be of as much importance to the Peruvians as the maize, potato, and wheat, is an annual weedy species, with an appearance similar to that of garden orach, to the size of which it grows. Its flowers appear in close clusters about the ends of the branches, and are succeeded by a profusion of little black or white seeds (according to the variety) about the size of grains of millet. Its leaves are employed as spinach, and the seeds in soup or broth as rice, and in some parts of South America they are in as much use as rice in India. They are said to yield a pleasant beer when fermented. It is chiefly upon the highest land of Southern Peru, where neither barley nor rye will ripen, as, for instance, at the height of nearly 13,000 feet on the table-land of Chiquitòs, that quinoa forms the great article of agriculture; it there forms fields, the limits of which the eye can hardly reach, of a monotonous and unpleasant aspect, scarcely mixed with a single other species, and very unlike the rich and waving greenness of our standing corn. It is also extremely common about the great lake of Titicaca. The seeds are ripened in England, and may now be purchased at any of the seed-shops; but the plant can hardly be considered worth the attempt at cultivating it where any thing else will grow. (*Gardener's Magazine*, vol. x., 587; and Meyen, *Die Pflanzen Geographie*, 361.)

CHEPSTOW, a port and market-town, on the Wye (about 2½ miles from where it falls into the æstuary of the Severn), in the hundred of Caldicot, Monmouthshire, 110 miles nearly due W. from London. The parish of Chepstow contains 1020 acres; it is in the diocese of Llandaff. The population in 1831 was 3524; the average gross annual income of the incumbent of the parish was returned in 1835 at 214*l.* The parish then contained 21 daily and Sunday schools; one of which, containing 18 children, is endowed with 7*l.* per annum arising from land, and the interest of 100*l.*

The advantageous situation of Chepstow near the mouth of the Wye is supposed to have rendered it a desirable position both in Roman and Saxon times. It was formerly strongly fortified. The town is built on a hill gradually ascending from the river, and has a cheerful and lively appearance. From different points near the town the views are exceedingly beautiful—the scenery not being surpassed perhaps by any thing similar in Britain. The ruins of Chepstow Castle occupy an extensive area; the walls on one side are almost perpendicular with the cliff which overhangs the Wye; the erection of the edifice is attributed to the Normans in the eleventh century, but the architecture bears marks of a later date. In this castle Henry Marten, one of the judges of Charles I., was confined for upwards of twenty years after the Restoration, but his imprisonment does not appear to have been rigorous, though it only ended with his death. His family was permitted to live with him.

The Wye is navigable for large vessels only to Chepstow bridge, which is a massive structure of iron, erected in 1816; but barges from eighteen to thirty tons burthen can go as high as Hereford. The spring tides at Chepstow frequently rise above 50 feet.

There are no manufactories in the town or neighbourhood of Chepstow, but the town has a considerable export and import trade. It is lighted with gas, the expenses of which are defrayed by a donation from a private individual; it is also well paved, and kept clean. The gross receipt of customs' duty at Chepstow, in 1834, was 902*l.*

CHER, a river of France, from which the department which it traverses receives its name. The source of its principal branch is in the eastern extremity of the department of Creuse, a little to the south of the town of Auzance. Two other branches, which rise in the same department, form a junction with it, as it enters in its northward course the department of Allier. It continues in the same direction through the western extremity of this department, passes by Montluçon, and enters the south-east boundary of the department of Cher. Near Saint Amand it takes a N.N.W. course to Châteauneuf, and to Vierzon, where it unites with the Auron. Turning due west, it receives the Aron, passes the town of Selles, a little below which it is joined by the Sauldre and the Fouzon, and continuing its western course past St. Aignan, Montrichard, and Bléré, it falls into the Loire, a short distance below the city of Tours. This river is subject to great inundations. It has 29 locks to facilitate navigation; but from its source to St. Aignan, a distance of 48 leagues, it is serviceable only for the floating of timber. The remaining portion of 19 leagues, from St. Aignan to the Loire, is navigable for boats, which convey wood, corn, charcoal, and fodder for cattle. The whole of its course is nearly 200 miles. It supplies several kinds of edible fish. The canal du Duc de Berri runs along the Cher from Chambon, on one of its upper branches, nearly as far as Ainay. A smaller river of the same name rises in the duchy of Bar, and falls into the Meuse. (*Encyc. Méthod. Géog. Phys.*, tom. iii.; Cassini's *Map of France;* Expilly.)

CHER, a department nearly in the centre of France, comprehends that part of the antient province of Berri called Haut Berri, and a portion of Bourbonnais. Its northern boundary is formed by the department of Loiret; on the south it has the department of Allier; on the west that of Loir et Cher, and of Indre, and on the east the department of Nièvre and the river Loire. It is included between 46° 25′ and 47° 40′ N. lat., and 1° 50′ and 3° 5′ E. long. The figure formed by its boundary line is very irregular. Measured north and south its greatest length is 86 British miles, and its greatest width, east and west, 56 miles. The whole area contains 1,450,134 acres (*Diction. Universel*, by Prudhomme), or 2265 square miles. Bourges, its capital city, has a population of 18,000, and is due south of Paris, from which it is distant 125 miles in a straight line. The population of this department, in 1826, was 249,000 (Balbi, *Abrégé Géog.*), that is, between 109 and 110 to a square mile. The surface of the country is generally level, and the whole department is extremely well wooded. There are six forests that of Allogny, of Aubigny, of Bornacq, of Haute Brune, of Vierzon, and of Yvoy. They cover 150,000 hectares*, or 371,040 English acres, and furnish excellent timber for house and ship-building. Besides the Cher, there are several other considerable streams, namely, the Auron, Aron, and Sauldre, all of which belong to the basin of the Cher. In the southern and south-western parts the soil is only of a medium quality, and rushy ponds are numerous; in the northern and north-western portions are marshes, surrounded with tracts either entirely barren and sandy, or covered with furze and thistles.

In the central parts, as well as on the banks of the Auron and Cher, the land is remarkably rich, and especially on the eastern side, along the border of the Loire, where it possesses the highest productive qualities. About two-thirds of the whole surface of this department are more or less sterile and useless, and the rest exhibits the greatest fertility. Pasturage for sheep and horned cattle is abundant, and consequently great numbers are reared. The wool produced in this district is considered the best in France: the mutton also is said to be very good. Horses are generally diminutive in size. Game, poultry, and fish are abundant. All the various sorts of grain yield plentiful crops. Still, there is no perceptible improvement in agriculture; nor indeed in any other of the industrious arts. It is remarked by Malte Brun (*Géog. Univers.*, tom. iii. p. 492, 1832) that the inflexible perseverance with which the inhabitants adhere to the clumsy routine of their ancestors prevents any development of the great natural resources of this department, and accounts for the fact, that, while they have at hand a large supply of the finest wool, only a very few manufactories of inferior woollen cloths exist among them, that while they grow abundance of hemp and flax, they manufacture no linen fabric; that, with a very large home production of wax, the making of wax candles appears never to have been attempted, &c. One fact alleged as a cause of the want of improvement in agriculture, is, that the land is generally the property of great proprietors, who let the farms on short leases, and consequently

* A hectare is equal to 2·4736 English acres.

destroy every incentive to exertion. Fruits of various kinds are produced in profusion, as well as the finest esculent vegetables. The vine is cultivated with considerable success, and produces the white wine which is sold in Paris under the name of Chablis. There are also small manufactures of paper, potass, porcelain, delf-ware, nut-oil, and saltpetre. The mineral productions of this department are important. Silver mines once existed; but they have ceased to be worked. Ochre is said to be obtained of a quality preferable to that of England. There are quarries of granite and marble Mention is also made of manganese, potter's clay, and gypsum; but by far the most valuable object of mining operations in this department is iron, which is found in great abundance and of very superior quality. It does not lie at a great depth, but is procured a few feet below the surface, where it appears in a granulated form, rather roundish and of a reddish colour. Numerous and extensive iron-works are established for the manufacture of iron and steel implements, nails, &c. The vigour with which this species of industry is prosecuted presents an exception to the general supineness which we have mentioned. The iron trade forms indeed, with the sale of wool, cattle, and timber, the chief source of wealth to the inhabitants. The great deficiency of means of conveyance has been partially supplied by the opening of the canal of Berri. [CHER, River.]

This department is divided into three arrondissements, which are subdivided into 29 cantons and 307 communes. The seat of the prefecture is at Bourges. The other considerable places are Sancerre, which stands on the highest hill in the department, and is engaged in the wine trade; population about 3000. St. Amand, on a branch of the river Cher, in a pleasant valley; population about 5000; and Vierzon, on the Auron. At Yvoy le Pré there is a glass manufactory. Henrichemont was built by Sully in honour of Hen. IV.: it has a large tannery. This department sends four members to the Chamber of Deputies: it is comprised in the 15th military division; and is within the jurisdiction of the Cour Royale of Bourges.

The department of Indre and the department of Cher form the metropolitan diocese of Bourges. (*Encyc. Méthodique, Géog. Phys.*, tom. iii.; Malte Brun; *Dict, Geog. Universelle*, 1825; Balbi, *Abrégé de Géog.*, 1833.)

CHERBOURG, a fortified city and sea-port of France, on the northern coast of the department of Manche, and one of the principal stations of the French navy. It is situated at the southern extremity of the bay and roadstead of La Manche, in lat. 49° 38′ N., and long. 1° 40′ W., opposite the Isle of Wight, 190 miles W.N.W. from Paris. Cherbourg is of great antiquity. By Froissard it is said to have been founded by Cæsar, when he invaded Britain, but by others it is denied that Cæsar ever visited this portion of Gaul. In 1418 the city was besieged by the English, to whom, after three months' resistance, it surrendered; but in 1450 it was re-taken by Charles VII., who finally expelled the English from the coasts of Normandy. Its castle, in 1680, was demolished by Louis XIV. For a detailed historical account, see the work of Expilly. It contains several capacious arsenals for marine and military stores; but that which is most remarkable at Cherbourg is the great *digue*, or breakwater, and the excavated dock for the navy. The latter, which was made by Napoleon, was opened in 1813, and is scooped out of the earth and solid rock, a little to the west of the city. It is 1000 feet in length, 770 in width, 50 in depth, and occupies about 18 acres. At low water it has a depth of 25 feet, and is capable of receiving 60 ships of the line: there is also a commodious commercial dock, distinct from that for the navy. The cost of both was about 5,000,000*l.*, as it is stated in several recent English works, but it must mean francs, which would be about 200,000*l.* The breakwater is to the north of the port, and extends from east to west 4095 yards, so as to leave a passage at each end. It was commenced under Louis XVI., and although continued at great expense by Napoleon, it is still not completed. The work was begun by the submersion of enormous conical frames of oak, having at the base a diameter of 140 feet, and 60 feet at the summit. These, and the intermediate spaces, were afterwards filled by dropping in large unhewn blocks of granite and sandstone, of which the whole mass is much overrated by some authorities. (Malte Brun.) The *rade* or road, thus formed on the southern side of this rampart, is sufficiently spacious for the anchorage of 100 vessels. A full description is given in Arthur Young's 'Voyage en France,' tom. i., p. 234, et seq. Cherbourg contains a population of about 15,000: it has a school for navigation, a college, a royal academy, a board of trade, a theatre, public baths, and a promenade.

The houses are of stone, and roofed with slate, of which there are several quarries in the neighbourhood. The church was founded in 960. The streets are narrow, gloomy, irregular, and very uncleanly, though water is abundantly supplied from several public fountains. There is some trade in corn, cattle, cheese, butter, and bacon, the produce of the neighbouring districts, and a small manufactory of coarse cloths and druggets. The environs furnish an ample supply of esculent vegetables and flax. In the adjoining forest of Tour la Ville there is a very extensive manufactory of glass, which employs about 200 workmen. The temperature of Cherbourg is very mild with respect to its latitude; the thermometer being constantly five degrees higher than at Paris. (Malte Brun.) The views of Napoleon respecting Cherbourg, as given in the Journal of Las Cases, are very interesting. (*Dic. Universel de Géog.*, 1825; Expilly; *Encyc. Méthodique;* Reichard's *Road Book of France.*)

CHERIMOYER, the fruit of a Peruvian downy-leaved species of Anona, the A. Cherimolia: it is described as the fruit most esteemed by the people of the western parts of South America, and is very like the Custard Apple of the West Indies. [ANONA.] It is a tree about twelve feet high; the leaves are oval, pointed at both ends; the flowers solitary, very fragrant, of a greenish-white colour, and the fruit somewhat heart-shaped, with a scaly appearance on the outside; when ripe it is greyish-brown, or black. The flesh is white and sweet, mixed with several seeds of the colour of coffee. The Creoles think this fruit the best of the country; Baron Humboldt speaks of it in terms of high praise, and his account is completely confirmed by the testimony of many officers who have been in the South American service; but Feuillée says, one European pear or plum is worth all the cherimoyers of Peru. The latter author has figured it in his *Journal des Observations, &c.*, 3, t. 17.

CHEROKEES, the name of one of the native tribes, inhabiting the southern states of the North American Union. A century ago they formed a numerous and powerful nation, which was in possession of the southern portion of the Appallachian Mountains and the countries on both sides of the range, so that their hunting-ground extended over a part of the States of Tennessee, North and South Carolina, and Alabama, and over nearly half the State of Georgia. After a British colony had been settled in Georgia (in 1732), the native tribes began to lose ground. The Cherokees however maintained their footing for a long time, even after these countries had obtained their independence. Since 1790, they have sold different portions of their territories to the government of the United States. In 1809 they consisted of 12,359 individuals. In 1816 they ceded the country still possessed by them within the State of South Carolina, and some districts in Georgia and Alabama, receiving in consideration of this cession, besides presents and annuities, a tract of country of equal extent west of the Mississippi, to which some families emigrated. At the census of 1830 the Cherokees remained only in Georgia, where they amounted to about 5000 individuals; and in Alabama, where they were about half that number. In 1834 the State of Georgia resolved to expel them from that extensive tract of Georgia which lies to the west of the river Chatahoochee; and the better to effect this, they ordered the Moravian Brethren, who had settled among them for the purpose of instructing them in the Christian religion, to leave the country. No sooner had the intention of the government of Georgia become evident, than the Indians applied to Congress for protection, and Congress declared that the decree of the legislature of Georgia was illegal. But the State of Georgia decreed that Congress had exceeded its powers, and they enforced their own law by sending soldiers into the territory of the Cherokees in 1835 and expelling the Indians. Alabama at present is the only place east of the Mississippi where Cherokees are found: they occupy in this State the country about the upper branches of the river Coosa, and may consist of between 2000 and 3000 souls. [ALABAMA.] The remainder of this once powerful tribe is wandering about west of the Mississippi, on the banks of the Arkansas and White River.

The Cherokees are considered the most civilized of the American Indians. They have made considerable progress in agriculture and domestic manufactures, and in the raising of cattle. They chiefly cultivate cotton and Indian corn. They have a written language; the alphabet, which was invented by a native Cherokee, consists of 85 characters. Their language is derived from the same source as that of the Creeks, Chickasaws, Choctaws, Pasiagoulas, and some other tribes; and as all these tribes lived in the neighbourhood of Florida, these languages have obtained the name of the Floridian languages. (Franklin's *First Journey to the Polar Sea;* Darby.)

CHERRIS, an intoxicating drug, prepared from the common hemp.

CHERRY. [CERASUS.]

CHERRY, a valuable fruit, of which great numbers of varieties are known in our gardens; they are all the produce of *Cerasus avium*, or *C. vulgaris* [CERASUS], or of plants obtained by the intermixture of those two original species. Independently of their value as an article of luxury, and as yielding by distillation such liqueurs as Maraschino (so called because the Dalmatian *Maraschi* cherry is employed in its manufacture) and Kirschenwasser, cherries contribute essentially to the support of the poorer classes in some countries, not only in puddings and tarts, but as a principal ingredient in a kind of soup, and as a dried provision for winter. Their timber moreover is valuable for the more common kinds of cabinet-maker's work, and as in favourable soils they grow fast, they often afford to the planter a quick and good return for the outlay of his money. It is however only upon light sharp well-drained soil that the cherry thrives; when planted in stiff and wet soils it grows slowly, gums very much, and falls into a state of incurable bad health. Its varieties are multiplied by budding or grafting: the former is best performed upon the common wild cherry, the stones of which are collected by the nurserymen for that purpose. Like all other fruit trees that have been objects of cultivation, the cherry has given rise to a multitude of varieties, from among which it is difficult for any but professed gardeners to know how to make a selection. We should say that for all useful purposes the following are sufficient. The earliest are the Black Tartarian, and the Early Purple Guigne; the Early May, which ripens close about the same time, is not worth cultivation; these are succeeded by the May Duke, the Bigarreau, the Elton, and the Black Eagle; the Late Duke is the latest of the sweet cherries. For puddings there is the Kentish; for preserving in brandy, the Morello; for drying, the Belle de Choisy, the Flemish, and the Kentish. These are amply sufficient for a small garden, and are all good bearers: the Morello only actually requires a wall. If more variety is wished for, the Black Heart and the Downton may be added: and these are all out of the two hundred and nineteen varieties mentioned in the Horticultural Society's valuable Fruit Catalogue which are at all worth cultivating.

CHERSON (pronounced Kherson), a town in Southern Russia, 46° 40′ N. lat., and 32° 40′ E. long., was founded in 1778, on the right bank of the Limán, or æstuary of the Dnieper, which is here nearly four miles wide, when its numerous shoals are covered with water. It was designed to be the principal station for the Russian navy in the Black Sea, but it has not answered this purpose. It is only during the spring-flood that vessels of considerable size can pass from the town to the fortress of Kinburn, at the mouth of the Limán, and then only by means of camels. Still it contains docks for vessels of war, and merchant ships. It continues to be the principal depôt for all the stores which are required for the equipment of the fleet on the Black Sea, principally on account of the ease with which they may be conveyed to this port from the interior of Russia down the Dnieper. The town, which is regularly and well built, consists of four parts—the fortress, the admiralty, the Greek suburb, and the suburb of the marine soldiers. Its commerce is not considerable, and is carried on by the Greeks who inhabit the Greek suburb. The country about the town is very barren. In one of the villages, called Dauphigny, is a monument erected in honour of John Howard, who died here in 1796. Population 14,000.

CHERSONESUS (χερσόνησος), a Greek word signifying 'peninsula.' The term was applied more particularly to the small peninsula between the Hellespont and the Gulf of Melas, then called the Thracian Chersonesus; and to the peninsula now called the Crimea, which was called by the Greeks the Taurica Chersonesus.

CHERTSEY. [SURREY.]

CHERUSCI, a people of antient Germany, who bordered on the Catti and the Chauci, living inland or south of the latter, and near the banks of the Visurgis or Weser. The Cherusci being excited by Arminius, joined the Catti and others in the attack and defeat of Varus and his legions. They were afterwards defeated by Germanicus. After Germanicus left Germany and the Romans had drawn their legions back to the banks of the Rhine, the Cherusci quarrelled with the Suevi and afterwards with the Catti. Under Claudius the Cherusci sent messengers to Rome, to ask, as a king, for one Italicus, of the race of Arminius, who was born at Rome, of German parents. Italicus, however, on his arrival in Germany, was looked upon by many of his countrymen as an alien, and a degenerate descendant of Arminius. He was expelled from his kingdom, but afterwards recovered it with the assistance of the Langobardi. (Tacitus, *Annot.* xi. 16, 17.) In the time of Tacitus the Cherusci had declined from their former importance, having been overpowered by the Catti and other neighbouring tribes, and were considered as having degenerated. (*German.* 36.)

CHERVIL, a culinary vegetable, the Scandix cerefolium of botanists; it is an annual, and a native of the south of Europe; its leaves have a slight aromatic taste, and are used in soups and salads: it is little cultivated.

CHESAPEAKE BAY is the deepest indentation on the eastern shore of North America, between Florida Reef and the Bay of Fundy. The entrance, which is about 12 miles wide, lies between Cape Henry and Cape Charles, both in the State of Virginia, and is cut by the parallel of 37° N. lat. From the entrance the bay runs N., with a slight bend to the W. to 39° 33′ N. lat. or about 170 miles. Its breadth varies considerably. From its entrance to the mouth of the river Potomac, or for about 70 miles, its average width is 25 miles; but farther N. up to the river Susquehannah it does not exceed 10 miles. This would give a surface of about 2750 square miles. But in this calculation the smaller bays and channels are not included which are formed by the embouchures of the James River, York, Rappahannock, Potomac, and others, which may cover a surface of about 750 square miles, so that the area of the whole bay probably does not fall short of 3500 square miles.

A great number of considerable rivers fall into this bay which bring down all the waters from the eastern declivity of the Appalachian mountains, and from their numerous ranges between 37° and 43° N. lat. This circumstance might induce us to consider the bay as only a vast æstuary, especially as its shores are mostly low or very little elevated. But on the other hand we find that its depth is so considerable, that it may be navigated by large vessels in all parts, which does not answer the character of an æstuary Its shores also, even where there are no large rivers, are much indented, and form numerous harbours for vessels of different sizes. The bay and the rivers which flow into it are navigated by numerous steam-boats which keep up a ready communication between all the countries lying on the bay.

The great rivers which flow into the west side of the Chesapeake bay, taken from N. to S., are the Susquehannah, Potomac, and James river, all of which rise within the Appalachian range, where they flow in longitudinal valleys Besides these there are numerous smaller rivers, such as the Patapsco, Patuxent, Rappahannock and York river, all of which descend from the east slope of the Blue Ridge, and have no part of their course within the Appalachian range. Ships of war can ascend the Potomac to Washington, which is 120 miles from the mouth of that river, measured along its course, and near 200 from the entrance of the Chesapeake.

CHESELDEN, WILLIAM, a distinguished surgeon and anatomist of the last century, was born in Leicestershire, in 1688. His general education appears to have been limited, at least in point of time. At fifteen he commenced his medical studies in London, under the best instructors; and began himself to give lectures in anatomy in 1711, which he continued for twenty years with a reputation not far inferior to that of his master, Cowper. Becoming soon favourably known, he was elected a fellow of the Royal Society in 1712 at the age of twenty-three, and repaid this early distinction by a variety of interesting papers in the

Philosophical Transactions.' The most remarkable of them, communicated in 1728, is an account of the sensations of a youth of fourteen, blind from infancy, on recovering his sight by the formation of an artificial pupil. The memoir has been much quoted by metaphysical writers the operation, now common, was then perfectly new; and has added considerably and justly to Cheselden's fame.

In 1713 he published a work on anatomy which was long the text-book of that science in England, and was frequently republished both before and after his death. The eleventh edition was printed in 1778.

On the retirement of his tutor, Mr. Ferne, Cheselden succeeded him as surgeon to St. Thomas's, and was afterwards appointed consulting surgeon to St. George's and the Westminster hospitals. He turned these opportunities to good account in maturing his own skill and advancing the science of surgery, which is largely indebted to him. He was probably never surpassed in dexterity and success as an operator; his coolness never deserted him; and he is said to have been as much distinguished for the tenderness as for the judgment that directed his hand. We are told that out of forty-two patients whom he cut for the stone in four years, he lost but one; the present average being at least six in that number An eye-witness of many of his operations, the author of his éloge in the Memoirs of the French Academy of Surgery, of which he was the first foreign associate, assures us that he once extracted the stone in fifty-four seconds. Too much weight, however, may be attached to these surprising instances of success; even if truly recorded, they must have been in part the result of good fortune, or of a very judicious selection of cases for operation.

It is in lithotomy that Cheselden has most repute as an innovator as well as an operator. In 1723 he published a volume on this subject, recommending an improved method of performing what is called the *high* operation; but after more experience and investigation, he laid it aside for the *lateral* method, of which, as at present practised, he may almost be considered the inventor. His splendid work on the bones was published by subscription in 1733, with a dedication to Queen Caroline, to whom he held the appointment of surgeon. It consists of a series of plates of the natural size, with short descriptions; and is unequalled in execution, and, except in a few particulars, unsurpassed in accuracy. It was not successful as a speculation, and was attacked with bitterness, as had been his treatise on the high operation, by a lithotomist of the name of Douglas, who seems to have considered Cheselden an intruder.

In 1737, after a brilliant professional career, and, it is said, partly in disgust at the asperity to which his success had exposed him, Cheselden retired from practice at the age of forty-nine, and undertook the honorary duties of surgeon to Chelsea Hospital, which he retained for the rest of his life. His last contribution to science, made subsequently to his retirement, consisted of a series of plates with original remarks appended to Gataker's translation of Le Dran's Surgery.

In 1751 he suffered an attack of apoplexy from which he entirely recovered; but a return of the complaint caused his sudden death at Bath, on the 10th of April, 1752, in his sixty-fourth year. He was married, and left one daughter, the wife of Dr. Cotes, M.P. for Tamworth, who died without issue.

His reputation as a surgeon was solid, and will be lasting. As a man, much that is good is recorded of him, and nothing unfavourable, unless it be his fondness for pugilistic exhibitions, which might have their interest for him as an anatomist. He befriended Thomas Chubb, probably out of simple benevolence, as he is not said to have shared in his opinions. He associated with Pope and other wits of his time; but as his classical merit was certainly not considerable, their intimacy may be ascribed to his professional eminence and strong natural talents, rather than to the taste for literature and art, upon which he seems to have prided himself with no great reason.

CHESHAM. [BUCKINGHAMSHIRE.]

CHESHIRE, a county palatine on the west side of England. The name is formed from the antient city of Chester, and is an abbreviation of Chestershire, formerly written, in Saxon, Cestre scyre. The boundary line is very irregular. On the N.W. a tract of a peninsular form is included between the æstuaries of the Mersey and the Dee; and on the N.E. a long narrow tract, containing part of Featherbed Moss and Holme Moss, which belong to the central high lands of England, is included between the Thame and the Etherow, which by their junction form the Mersey. The county is said by some writers to be 'like the wing of an eagle stretched forth at length.' (King's *Vale Royal of Cheshire*.) The whole county received the name of Vale Royal of England, from the magnificent abbey so called, which was founded by Edward I. on the Weaver. Cheshire lies between 53° and 53° 34′ N. lat., and 1° 47′ and 3° 11′ W. long. Its northern boundary is chiefly formed by Lancashire, and partially by Yorkshire and the Irish Sea. The Mersey forms the boundary between Cheshire and Lancashire. On the east, the county has Derbyshire and Staffordshire; on the south, Shropshire and a small portion of Flintshire; and on the west, Denbighshire, Flintshire, and the Irish Sea. The greatest length of the county from N.E. to S.W., in a straight line, is about 58 miles; the greatest width from N. to S. about 32 miles: the whole circuit is nearly 200 miles. On the N.W. extremity, a line of sea-coast extends for about 8 miles from E.N.E. to W.S.W., besides about 20 miles on the æstuary of the Mersey, and about 14 on the great æstuary of the Dee. The area of the county is 665,600 acres, or 1040 square miles; to which may be added 10,000 acres as the sands of the Dee. (Ormerod's *Cheshire*, vol. i. p. xliv.) According to Mr. Holland (*Agricul. Survey*) there are 676,000 acres, of which 620,000 are in cultivation, including parks and pleasure grounds; 28,000 in waste lands, commons, and woods; 18,000 in peat bogs and mosses, and 10,000 in sea-lands on the æstuaries of the Dee and Mersey The total population of the county, in 1827, was 270,098; in 1831, 334,410. (*Boundary Report.*) Chester, the county town, is 183 miles N.W. from London.

Surface, Hydrography, and Communications.—The surface of Cheshire is in general a nearly uniform level, but there are a few inequalities. There are several elevated tracts stretching in a general north direction. One is between the Goyt and the Bollin; and a second between the Bollin and the Weaver. A tract of high land extends also from N. to S. across Delamere Forest, terminating to the N. near Frodsham in a high promontory which overlooks the Mersey, and to the S. in the rock on which Beeston Castle stands; the height of this rock is 366 feet above the sea. Alderley Edge, a few miles N.W. of Macclesfield, is an isolated hill which rises abruptly out of a level country, and presents one of the richest and most extensive prospects in the county; but Cheshire, from its general flatness, is not in general remarkable for picturesque beauty. In the eastern part of the hundred of Macclesfield are several extensive tracts of black moor, or bogs of peat-moss; and in the vicinity of Macclesfield are the high lands already referred to between the Bollin and the Goyt, which spread eastward into Derbyshire, and form on the Cheshire side a kind of mountain-wall. These high lands appear also near Congleton, and stretch southward to Talk, in Staffordshire. In former times there were numerous forests in Cheshire; one is mentioned in the Domesday Survey of Alticross as being ten miles in length and three in breadth. At present there are only a few large woods. Some at Dunham Massey contain many noble old oaks. Around Delamere Forest, in the hundred of Eddisbury, there are several extensive plantations, chiefly of Scotch firs and larches. This forest, so called, is a large sterile tract of whitish sand, partially covered with heath and peat-moss. It occupies 10,000 acres; of which a considerable part has been enclosed and brought into cultivation. The most extensive plantation in the county is that of Francis Jodrell, Esq., which covers 1000 acres. The timber supplied by the great profusion of hedge-row trees makes ample amends for the loss of the antient forests. It is principally oak, and furnishes abundance of tanner's bark. A large quantity of fine timber is also produced on the numerous estates of the nobility and gentry; especially on those of Earl Grosvenor, of the Earl of Stamford and Warrington, and of the Marquis of Cholmondeley. In many parts land left to itself becomes spontaneously covered with oak and alder.

Cheshire abounds not only with rivers and brooks, but with broad sheets of water called meres, which generally contain fish. The principal are Oak mere, Pick mere, Budworth mere, Rosthern mere, Mere mere, Tatton mere, Chapel mere, Moss mere, Broad mere, Bah mere, and Comber mere, which is three-quarters of a mile in length.

The chief navigable rivers are the Dee, Mersey, and Weaver. The navigation of these rivers is superintended, and

has been greatly improved, by companies incorporated by acts of parliament. The source of the Dee is in Merionethshire, where, in conjunction with another rapid stream descending from the heights between Dolgelly and Dinasmowddy, it forms the lake Tegid, or Pimble mere, otherwise called Bala lake, the largest in Wales. Passing Bala and Corwen, it runs E. through Denbighshire, by Llangollen, nearly to Overton, in Flintshire, where it turns northward to Bangor. Continuing in the same direction, it becomes the boundary of Cheshire nearly from Worthenbury to Aldford. It then intersects the northern part of the hundred of Broxton to Chester, which it half encircles. From Chester it flows in a straight artificial cut into the broad æstuary of the Dee. A surface of about 2500 acres has been reclaimed from the S.E. extremity of this æstuary. From Bangor bridge the Dee is navigable for barges. At Chester bridge it is 100 yards wide, and vessels of considerable tonnage can pass by the new channel to Chester. The whole length of the course of the Dee is about 55 miles. It supplies salmon, trout, and other kinds of common fish. This river, called, in Latin, Deva, in British, Pifir dwy, was antiently held in great veneration, and its waters were considered sacred for religious ablution. As such it is celebrated by Drayton, Browne, Spenser, and Milton. (Dr. Warton's note on Milton's *Lycidas*, Todd's ed., vol. v.)

The Mersey in its whole course divides Cheshire and Lancashire. It is formed, and first receives its name, by the confluence (near Stockport) of the Thame and Goyt: the Etherow (which joins the Goyt a little above Stockport) and the Thame rise in the central highlands, N. and N.E. of Stockport; the Goyt rises near Buxton on the east side of the highlands between Macclesfield and Buxton. Leaving Stockport the Mersey runs a general west course to Northenden and Ashton. After passing by Carrington, it receives on the right bank the Irwell from Manchester, and on the left, a little below Warburton, the Bollin. It continues with a very winding course through a low, flat country past Warrington, and expands at its junction with the Weaver into a wide æstuary which forms the Liverpool channel; and though much obstructed by banks of sand, is rendered safe by the excellent system of pilotage. The Mersey is navigable from its confluence with the Irwell. At Warrington it is 40 yards in width; opposite Liverpool the width is a mile and a quarter, with a considerable depth at low water. The greatest width of the æstuary above Liverpool is between Eastham and Frodsham, where it is above three miles wide. Its whole course from Stockport to the outlet of the æstuary is about 55 miles. A large marsh at the confluence of the Weaver, extending to Helsby and Frodsham, is subject to occasional inundations. The river and æstuary contain congers, plaice, flounders, and shrimps; with annual shoals of smelts, called sparlings, remarkable for size and flavour. Some remarks are made in Ormerod's *Cheshire* (vol. ii.) on the antient communication of the S.E. extremities of the æstuaries of the Mersey and the Dee; by which the present peninsula of Wirrall was made an island.

The Weaver traverses the central parts of Cheshire from S. to N. It rises in the north of Shropshire, near the village of Stych, and after receiving several considerable brooks and rivulets, runs by Nantwich, Minshull, and Winsford, to Northwich, where it forms a confluence on the right bank with the Dane, which rises in the same swamp as the Goyt, and, a little farther north, with the Peover. It then winds W.N.W. and falls into the Mersey below Frodsham. From Winsford to Frodsham it has been rendered navigable by ten locks; the total fall being 50 feet. About 120 vessels, from 20 to 100 tons, convey rock-salt down the river, and return with coal. The whole course of the Weaver is about 40 miles. Among the less important rivers is the Dane, which is joined by the Wheelock above Northwich. The source of the Bollin is in Macclesfield forest, near that of the Dane. It passes Macclesfield and Wilmslow, is crossed by the Bridgewater Canal, and enters the Mersey near Warburton, after a course of about 23 miles. The Peover rises S. of Macclesfield, near Gawsworth, and flows W.N.W. to its junction with the Weaver near Northwich.

Several canals intersect the county. The Bridgewater Canal enters Cheshire by crossing the Mersey near Ashton. Its length within the county of Cheshire is about 24 miles. [BRIDGEWATER, DUKE OF.] The Grand Trunk, or Trent and Mersey Canal, which was commenced in 1766, runs south-east from Preston Brook, by Northwich, Middlewich, and Sandbach, and leaves Cheshire at Church Lawton, on the borders of Staffordshire. Between Preston on the Hill and Dutton, not far from its commencement at Preston Brook, it passes through a tunnel 1241 yards in length; at Barnton, through another of 572 yards; at Saltersfield, through one of 350 yards; and finally, at Hermitage, through another of 130 yards. The whole of its line in Cheshire is about 20 miles.

The Chester and Nantwich Canal, which connects these two towns, was completed in 1778. At Chester it forms a junction with the Dee, and with the Dee and Mersey Canal, which runs across the peninsula of Wirrall to the Mersey, at Ellesmere Port. Four miles north of Nantwich, a branch from the Chester and Nantwich Canal runs to Middlewich, and is called the Middlewich branch. From the point where the Chester and Nantwich Canal and the Middlewich branch unite, the canal which thence runs south to Nantwich, and past Audlem into Shropshire, is called the Birmingham and Liverpool Junction Canal. The Ellesmere Canal branches off from a point between Nantwich and the point where the Chester and Nantwich Canal is joined by the Middlewich branch, and runs to the neighbourhood of Whitchurch. From Church Lawton the Macclesfield canal runs past Congleton, Macclesfield, and so on northwards to the Peak Forest Canal, which it joins a few miles north of Disley.

The Peak Forest Canal enters Cheshire at Ashton-under-Lyne, where it crosses the Thame, and passing near Disley, quits the county at Whaley Bridge. It crosses the Goyt below the junction of the Goyt and Etherow, by an aqueduct 100 feet in height, which has three arches, each 60 feet span and 78 feet high.

Several important roads traverse this county. The road from London to Manchester by Derby enters the county near Bosley, and passes through Macclesfield and Stockport. Another branch of the same line enters at Whaley Bridge, and leaves the county at Stockport. The road from London to Manchester by Lichfield runs through this county by Church Lawton, Congleton, Wilmslow, and Cheadle. The road from London to Liverpool also enters at Lawton, and runs to Warrington by two branches, one through Knutsford, the other through Middlewich and Northwich. The Birmingham and Liverpool Railway, as projected, enters the county near Belley on the south, and runs a little to the west of Middlewich and Northwich to the Mersey, which it crosses near Warrington.

Geological character.—The general character of the Cheshire soils is a clayey or sandy loam; tracts of peatmoss cover a large extent of the eastern portion of the hundred of Macclesfield. Some mosses of smaller extent are at Warmincham and Coppenhall. The latter, which is almost cleared of peat, contained numerous trunks and branches of trees, chiefly of oak, beech, and fir, apparently broken off at different heights, and partially exhibiting the marks of fire. An antient road of gravel passed through the moss of Coppenhall.

The range of high land to the east of Macclesfield is a sandstone rock, which contains beds of coal: this sandstone range is bounded on the east by the limestone of Derbyshire. The high land, which includes Delamere forest, is also sandstone.

The most important mineral productions of Cheshire are fossil or rock-salt, and coal. The rock-salt is obtained near the banks of the Weaver and its tributary streams. It was first discovered near Northwich, in 1670, in searching for coal; it has since been found very abundantly in the townships of Witton, Wincham, Winnington, and Marston, near Northwich. There are salt-works also at Nantwich, Middlewich, and Winsford. It is of two kinds, the one white and transparent, the other of a reddish-brown. The former has been found by analysis to be an almost pure muriate of soda: the latter contains a small portion of oxide of iron, from which its colour is derived.

The principal salt-works are in the neighbourhood of Northwich, where alone there are mines, in addition to brine-springs. The rock-salt is found from 28 to 48 yards beneath the surface of the earth. The first stratum is from 15 to 25 yards in thickness, extremely solid and hard, and resembling brown sugar-candy. Many tons at a time are loosened by blasting with gunpowder. The second stratum is of hard stone, from 25 to 35 yards in thickness. The salt lies beneath this stratum, in a bed above forty yards thick, generally perfectly white and clear as crystal. The ex

ternal surface above these strata is of whitish clay and gypsum. About 60,000 tons of salt are annually taken from the pits in the neighbourhood of Northwich. Besides this quantity of fossil salt, not less than 45,000 tons are annually manufactured at the same place from brine-springs, which are from 20 to 40 yards in depth.

Coal of a good quality is found abundantly in the north-east part of the county, especially in the townships of Worth and Poynton, where there are very extensive collieries, which supply the manufactories of Stockport. At Donwall, in the hundred of Wirrall, there is also coal. Copper and lead are found at Alderley Edge and the Peckforton Hills; the former place supplies a considerable quantity of cobalt. There are several quarries of excellent freestone in this county, of which those at Runcorn, Manley, and Great Bebington, are the most important. Limestone is found only at Newbold Astbury. Mowcop Hill, or Molecop, which is partly in Staffordshire, has long been famous for its mill-stones. Marl is found in almost every part of the county, and is generally used for manure. Dr. Woodward (*Cat. Brit. Fossils*) speaks of a fibrous stalky substance, a kind of asbestos, as found in great abundance in beds of marl about High Legh. At Bug Lawton is a sulphur-spring, which is serviceable in scorbutic affections; and at Shaw Heath, near Stockport, a chalybeate of considerable strength.

Agriculture.—The soil and climate of Cheshire are peculiarly well adapted for the growth of grass. The soil is mostly composed of loams of various degrees of tenacity, and the climate is moister than the more eastern parts of England. Situated in an extensive plain between the Derbyshire and Welsh mountains, Cheshire is seldom exposed to long droughts. The low meadows along the banks of the rivers are very subject to be flooded, which is one reason for keeping them in grass. Two-thirds at least of the county possesses a soil above mediocrity, of which the greater part is in permanent pasture, and produces the excellent cheese known as Cheshire cheese. The arable land is generally that which is thought too sandy for pasture, or of which the grass has deteriorated by neglect. Hence the arable part of a farm in Cheshire is seldom cultivated with that attention which is paid to similar land in those counties where good grass land is scarce. There are very few farms which consist chiefly of arable land. There is every where a predilection for the dairy. It may be safely asserted that, with the exception of gentlemen who hold farms in their own hands, of whom there are many of considerable wealth in the county, there are few farmers who deviate from the old routine, or seem inclined to adopt improved systems of cultivation. At the same time, there are perhaps few counties in England so susceptible of material improvement as Cheshire. It possesses great advantages; an easy communication by canals and rivers with the most populous manufacturing districts, and consequently a certain market for its agricultural products. According to the report to the Board of Agriculture, the county is divided as follows:

	Acres.
Arable and meadow land, including parks and pleasure grounds	620,000
Waste lands, commons, woods (a considerable part of which has been inclosed since)	28,000
Peat bogs and mosses	18,000
Sea lands in the æstuaries of the Dee and Mersey	10,000
	676,000

There are many large proprietors resident in Cheshire, but the class of yeomen is much diminished, and is replaced by small proprietors, chiefly retired tradesmen and artificers, or small farmers little raised above the common labourer.

Dairy farms require considerable buildings, and some have been erected by wealthy proprietors in the best and most substantial manner. The habitations for the family are quite sufficient for their comfort: many of the cow-houses are constructed on the Dutch plan. The heads of the cows are turned towards each other, with a passage in the middle for a small cart, by which the fodder is brought directly before the cows. It is thus given to them with greater cleanliness and economy than in any other way. Where many cows are kept, this will be found by far the most convenient arrangement of a cow-house. There is a description of one of these cow-houses in the 'Agricultural Report of Cheshire' (p. 84), erected at Ollerton, near Knutsford, which combines simplicity with great convenience. Large farms are not common in Cheshire. The average size may be considered as from 50 to 150 acres, that quantity being sufficient for the full employment of a family, and for a dairy of twelve to twenty cows. The rent of land is higher than that of the same quality in other parts of England, which is owing to the smaller outlay with which a dairy farm is managed. The implements of husbandry are in general such as have been in use for ages; a heavy ill-constructed plough, drawn by four or five horses in a line, with which they plough three-fourths of an acre of the heavy loams in a day. Harrows and rollers, the latter occasionally armed with spikes, are used to break the heavy lumps which the plough turns up, when the sun has baked them. Improved instruments are in use amongst the gentlemen farmers; but their example is seldom followed by the common renters of land. The effect of the dairy husbandry may be observed all through the county. Land is ploughed in order to have winter fodder for cattle, and to improve pastures overrun with weeds. Where the land is fit for turnips, which is not often the case, they are raised for the cows. Cabbages have been cultivated with some success in several farms, but there is no improvement in the mode of cultivating corn crops. It is not uncommon to see two or three crops of oats taken in succession from newly broken up land, and the last laid down with grass seeds. In this exhausted state it produces no good grass for many years, but plenty of weeds. The introduction of a good system of convertible husbandry would double the present produce of Cheshire. But we will not venture to affirm that the dairy produce would be improved at the same time. When land is brought to a high state of cultivation, and the artificial grasses give a great bulk of fodder, the quality of the cheese is often deteriorated; or to speak more correctly, the process must be varied. It is much easier to make cheese that will keep from poor pastures than from rich.

There is a simple instrument in use in Cheshire which deserves notice. It is a small strong scythe, called a hodding scythe, used to cut up rushes in pastures. It has a short handle, and the blade, which is about twenty inches long, is bent like a portion of a hoop. By a dexterous use of this instrument in spring, a man cuts up a tuft of rushes with a great portion of the roots, and as a hollow is left the water enters into the cut part of the remaining roots and rots them. The hollows should then be filled up with earth, and grass seeds sown over them. The rushes and roots cut off are put in a heap to rot, which is readily effected by the addition of quick lime, and thus an excellent compost is formed.

The cultivation of potatoes has been much encouraged in Cheshire, by the demand in Liverpool and the manufacturing districts. In that part of the county which lies along the æstuary of the Mersey, great quantities of very good potatoes are raised. The sandy and turfy soils, which are unfit for permanent pasture, are peculiarly fitted for the growth of potatoes. The neighbourhood of Frodsham has been long noted for the great quantity of potatoes it produces. The produce on good land is upwards of 10 tons per acre, but they require at least 25 tons of manure. The best potatoes grow on land broken up from grass, which had been laid down in a rich state; in this case no manure is required. When potatoes are very plentiful, and the price low, they are given to cattle, either boiled or raw, and in this way they are worth more than any other root, and produce much excellent manure. Early sorts are raised for the Liverpool market by a slight forcing. They are laid in a dry chamber and protected from the frost; they shoot early, and in that state, one shoot only being left, they are put into the ground in February, and occasionally protected by mats or straw. A slope of the beds towards the south-west is reckoned the most favourable exposure. They come in a month earlier than those planted at the usual time, and the land is cleared by the beginning or middle of June: a second crop is then put in, to be dug up in November. A warm sandy soil suits the early potatoes best. Near Warrington early potatoes are set in wide rows, and cabbages are planted between them: when the potatoes are taken up, the cabbages have the mould drawn round their stems, and attain a good size in spring. This is a cultivation which deserves to be more generally introduced on good strong loams.

Grass land is considered so much more valuable than arable, that most leases contain a clause, 'that not more than one-fourth of the farm shall be ploughed.' Many farms

have little or no arable land attached to them. A soil which is rather stiff is considered the best for grass, especially if there be a substratum of marl, which is the case in many parts of the county. The marl, when spread over the surface, materially improves the herbage. A very rich loam is not considered so good for pastures where cheese is made, as one less fertile, as it is apt to make the cheese heave. In Nantwich, and the western part of Northwich hundred, the substratum is chiefly marl, and the soil a stiff clay.

The natural grasses found in the good pastures are chiefly of those kinds which have been most approved of for sowing, when arable land is laid down to grass; viz., Poa pratensis, Poa trivialis, Festuca pratensis, or, on sandy loams, Anthoxanthum odoratum. In the Report it is stated that Rhinanthus Crista galli, commonly called yellow rattles, is very common in the pastures, and is said to be readily eaten by the cattle. It is in most places considered a sign of poor land, and lessens the value of the hay. The Cheshire farmers often defer mowing the grass for hay in a dry summer, in the hope of having a greater crop by waiting for showers; but this is a mistake, since it is much more profitable to cut the grass, however light the crop may be, as soon as the principal grasses are in flower, when the stalk contains the most nutritive juices.

Although much of the soil in Cheshire is well suited for fruit-trees, orchards are not common: the marly substratum is not well adapted for the roots of trees; deep, alluvial, and loose soils, are the best. The hedge-rows are in general well filled with trees, which gives the country, when seen from an elevation, the appearance of a continued forest. The forest of Delamere, as it is called, although, like many other antient forests, a great part of it is a mere waste without any woods, formerly contained 10,000 acres. It is now much reduced by enclosures, but a great portion is still waste.

Draining has been introduced extensively, and with the best effect, in order to carry off the superfluous surface water, which is common in many parts of the county. The shoulder drain is common in stiff soils. Paring and burning are not much practised, and this mode of preparing land for crops is in general reprobated by landlords as destructive of the soil; but when old worn-out pastures are overrun with bad grasses and weeds, there is no improvement more effectual.

The abundance of marl found in Cheshire is one of the chief means of improving the poor soils; 130 solid yards, or tumbril loads, of marl are put on an acre in the summer months, and left on the surface all the winter. In spring it is ploughed in, and makes the manure put on afterwards go much farther. Marling is a permanent improvement. Lime, and also sand, are put upon strong heavy lands to ameliorate the texture; the first does so, when put on in any proportions; the latter must be put in considerable quantities, and not ploughed in deep. It is a great improver of cold wet pastures, especially after they have been drained.

In the neighbourhood of the salt mines, refuse salt has been used for manure, and with success; but whether it owes its virtue to the salt, or to the earthy ingredients mixed with it, is still doubtful.

The number of rivulets in Cheshire might naturally suggest the applying of them to the purpose of irrigation; but this has been done in a few instances only.

In some places, where a rivulet could be turned, so as to flow through a farm-yard, and afterwards irrigate meadows situated lower down, advantage has been taken of this, as an easy mode of conveying the manure over the grass; in this they have imitated the common practice in most farms in Switzerland.

From the great number of dairy-farms in Cheshire, one would naturally expect to see considerable attention paid to the breed of cows; but, till lately, this was not the case; there were cows of all breeds, and crossed in every possible way. The great superiority of the improved short-horn breed has however made them more generally sought after. Some of the dairies have very fine herds, or packs, as they are called there, of short-horned cows, and some of Ayrshire cows; but this is by no means yet general; purity of blood is not much thought of. When a cow is a good milker, her cow-calves are weaned; and those heifers which are raised on the farm are thought to produce the most thriving cows. A cow is considered in her prime at four or five years old, and continues so till she is ten or twelve, after which she falls off, and should be fatted for the butcher. 'A good milker has a capacious and thin udder, without much flesh on it, teats standing well apart, and not too large; a deep belly, with very prominent milk veins; a light fore-quarter, wide loins, thin thigh, white horn, thin head, clean about the chaps and throat, and a full lively eye.' (*Agricultural Report.*) A cow that gives much milk is never fat, and her hip-bones project: her ribs appear distinctly under the skin. It is estimated that there are about 100,000 cows in the county, each of which gives on an average 2½ cwt. of cheese in the year; that is, altogether, 250,000 cwt., or 1250 tons. Each cow gives on an average about eight quarts of milk per day; some few give much more, and even as much as 24 quarts per day; but this is extraordinary, and only for a short time. Four quarts of milk make one pound of cheese; it takes from 12 to 15 quarts to make a pound of butter. A cow is in full milk for six months after calving, then three months in half milk, and three months dry. A plentiful supply of good fresh food, such as clover or tares, cut and carried to the stall, will often double the average of milk; but this is seldom practised in dairy counties. The cows are generally housed in November, or kept in yards, which is better. During the winter they are let out for a few hours each day into a paddock, or small meadow, near the homestead; they find nothing to eat there, but it gives them an appetite for their dry food when they come in again. Stall-feeding cows has been attempted, and with success; but this occasions too much trouble for the dairy-farmer, although the produce may be much increased, and the manure will amply repay the expense of the daily cutting and carrying of the fodder. Cow-calves which drop in February and March are usually reared: they are left three weeks to suck the cow, after this they have warm whey given them to drink, or oatmeal-gruel mixed with whey. Flax-seed, steeped in water until a jelly is formed, is also given them by some. For the first winter they have hay, in the next only straw. The heifers take the bull at two years old.

The making of Cheshire cheese is described minutely in the Agricultural Report for the county, to which we refer, as well as to the Article [CHEESE.]

Butter is made from the cream or from the whole milk allowed to coagulate and become sour. Good butter may be obtained in either way; but that made from fresh cream is always the best. An inferior butter is made from the cream which rises on the whey. [BUTTER.]

A considerable part of the profit of a well-managed dairy arises from the feeding and selling of pigs; but fewer pigs are kept in Cheshire than the dairies would warrant. The fatting of calves for the butcher is probably not so profitable, from the want of demand for veal in the country, as it would be nearer the metropolis.

The wages of agricultural labourers are good on the whole, and they are in general laborious and provident. The neighbourhood of manufactures tends to raise the wages.

The sheep husbandry, which is so profitable to the farmer in other counties, is scarcely known in Cheshire. Sheep do not go well with cows, as they pick out the finest herbage before it is long enough for the cow to graze. Some few are kept to consume the grasses which the cows refuse; they are seldom kept over the year, and are sold as soon as any profit is realized.

On the whole Cheshire is inferior to many other counties in agriculture, but it contains more means of improved husbandry than most. It wants only the application of capital, and the superintendence of men of true practical science, to become one of the finest agricultural counties in England.

Fairs.—Altringham, April 29, August 5, November 22; Budworth, February 13, April 5, October 2; Congleton, May 12, July 5, November 22; Chester, February 25, April 27, July 5, October 2, November 24; Frodsham, May 15, August 21, December 13; Knutsford, Whit-Tuesday, July 10, November 8; Macclesfield, May 6, June 22, July 11, October 4, November 11; Malpas, April 5, July 25, December 8; Middlewich, Holy Thursday, August 6; Nantwich, February 4, March 15, September 4, December 11; Northwich, April 10, August 2, December 6; Over, May 16, September 25; Sandbach, Easter Tuesday, Tuesday after September 10; Stockport, March 4—25, May 1, October 23; Tarporley, May 1, last Monday in August, December 11; Winsford, May 8, November 25.

Divisions, Towns, &c.—When the Domesday survey was taken, this county, exclusively of the lands between the

Ribble and the Mersey, now a part of Lancashire, though then considered a part of Cheshire, was divided into twelve hundreds. Except a few townships, the two antient hundreds of Atiscros and Exertan have also been taken from Cheshire, and added to the counties of Flint and Denbigh. The present division of the hundreds is supposed to have been made in the reign of Edward III.; and Lysons gives the proportion or relative size of old and new hundreds under the following table :—

New Hundreds.	Old Hundreds.
Wirrall,	Wilaveston.
Broxton,	Dudestan and Castra.
Eddisbury,	Riseton and Roelan.
Northwich,	Mildestric.
Nantwich,	Warmondestron.
Macclesfield	Hamestan.
Bucklow,	Bochelau and Tunendune.

It is to be observed that several of the townships which were in Dudestan are now in Eddisbury, and other variations have taken place; but the general arrangement of the hundreds of Cheshire is exhibited by the table.

Lysons states the number of market-towns to be twelve, excluding Chester:—namely, Altringham, Congleton, Frodsham, Knutsford, Macclesfield, Malpas, Middlewich, Nantwich, Northwich, Sandbach, Stockport, and Tarporley. Of the less important of these places we subjoin some account; those which are large enough to receive distinct notices are described elsewhere. [ALTRINGHAM, CONGLETON, MACCLESFIELD, NANTWICH, and STOCKPORT.]

Tarporley, in the hundred of Eddisbury and deanery of Chester, is a small market-town, near Beeston Castle, on the great road from London to Chester, from which it is distant ten miles east-south-east. It was antiently governed by a mayor, but at present by a constable. In 1642 a battle was fought at this place between Sir Wm. Brereton's forces and the Royalists from Chester, who, on this occasion, were victorious. Tarporley is pleasantly situated, cleanly, and neatly built, and is chiefly known as the scene of an annual fox-hunt in November, which is numerously attended by the county gentry, the neighbouring heaths being very favourable for this amusement. The church is an antient structure of the red sandstone, which abounds in this county: its interior contains several monuments, with inscriptions interesting to the antiquary, and some armorial bearings in windows of coloured glass. The living is a rectory, of which the net annual income is 644*l.* The inhabitants are chiefly employed in the manufacture of stockings and leather breeches. The market is on Thursday. There is an alms-house and Wesleyan chapel. Population, 1000.

Sandbach, a market-town in the hundred of Nantwich and deanery of Middlewich, was formerly celebrated for its ale. It occupies a pleasant eminence near the river Wheelock, and commands several extensive and picturesque views of the Vale Royal, the Staffordshire and Derbyshire hills, and the distant mountains of Wales. The worsted trade and manufacture of shoes, which formerly prevailed, have been succeeded by the silk manufacture, by which the town has risen to greater importance. It has some brine springs in the vicinity. In the market-place are two antient crosses, with sculptured images of the crucifixion. The living is a vicarage, of which the net annual income is 213*l.* Market on Thursday. Population, 6516.

Frodsham is 191 miles north-west from London; the population is 1746. This township is pleasantly situated on a rising ground at the foot of the hills which border on Delamere Forest, near the junction of the Weaver and the Mersey. Salt works and cotton manufactures are the chief employments of the inhabitants. The town is formed chiefly by two streets which intersect each other, and there is a graving-dock and yard for building and repairing vessels. The living is a vicarage, in the archdeaconry and diocese of Chester; the patron is Christ Church, Oxford: it is of the annual value of 590*l.* The church is a fine antient structure. Beacon Hill has some pleasant walks and fine views. On a site now occupied by a handsome modern mansion, stood formerly at the west end of the town a castle which Edward I. gave to David Llewelyn, the last sovereign prince of Wales, which was afterwards held by the earls of Rivers, and was consumed by fire in 1642. The parish of Frodsham is about thirty miles in circumference, and it contains eight townships. It abounds in springs, and produces large quantities of potatoes, which are used chiefly by the manufacturers of Lancashire. The Wesleyan Methodists have a meeting-house in Frodsham. There is a free-school, the salary of which is 100*l.*, and the teacher has besides a good house in Overton. There is also a charity for the relief of the orphans and widows of the clergy.

Knutsford, situated on the great road from London to Liverpool, is 172 miles north-west by north from London: the population is 3040. The market-day is Saturday. The name is said to be derived from Canute, the Dane, who passed with his army over the small branch of the Bollin, which runs past the town. The town is in the hundred of Bucklow, and is divided into Higher and Lower Knutsford by a branch of the river Bollin, which rises about half a mile to the south, and passing the turnpike road falls into Tatton mere. In Lower or Nether Knutsford there are a spacious county prison, a handsome town-hall, and the market-place. Knutsford was formerly part of the parish of Rostherne, but was made a distinct parish in 1741. The living is a vicarage, in the archdeaconry and diocese of Chester, of the annual value of 225*l.* The church is built of brick and stone, with a square tower. The Dissenters have three meeting-houses and two charity schools. Thread, worsted, and leather are the principal manufactures. Races are held every July near the town.

Malpas, situated on an elevation near the river Dee, in the hundred of Broxton, is 168 miles north-west from London: the population of the parish 5565, of the town 1004. The parish contains two rectories, one with the curacy of St. Chad, and the other with the curacy of Whitwell. The church was formerly the chapel of a religious house for monks of the Cluniac order; it is built of unhewn stone, and consists of a nave and chancel, without either aisle or steeple: it is highly ornamented, and some of its decorations have been supposed to be of Saxon origin. Courts leet are held here for the recovery of debts under 40*s.* Besides several meeting-houses, there are here two chapels of ease, an endowed grammar school for 12 boys and 12 girls, and also many charitable institutions. Malpas is the birth place of Matthew Henry, the commentator on the Bible.

Middlewich, situated near the confluence of the rivers Dane and Croke, is 167 miles north-west of London: the population of the parish is 4785, of the town 1325. Market-day is Tuesday. This town derives its name from its position between the wiches or the salt towns. Great quantities of salt are manufactured from the salt-springs here; cotton fabrics are also made. The Grand Trunk Canal runs through the town on its course to the Mersey. The living is a distinct vicarage, in the archdeaconry and diocese of Chester, of the net annual value of 128*l.* The church is large, and on the south side of it are a college and an oratory; the latter founded by the Leigh family of Lyme, the former by Thomas Savage, archbishop of York. The Dissenters have three meeting-houses; and there is a free-school. The petty sessions are held at Middlewich for the hundred of Eddisbury. The Rev. Theophilus Lindsay, a Unitarian divine of some note, was born here.

Northwich, in the parochial chapelry of Witton, is 17 miles east-north-east of Chester, and 173 north-west of London: the population, 1490. Camden states that it was called by the Britons Hellath, or Hellah Du, that is, the Black Salt Town. It is in the line of the northern Watling Street. The town was fortified and garrisoned by the parliament party in 1643, and was taken by the royalists and retaken by their enemies. The principal manufacture is salt. The Weaver runs through the town. Vessels of small burden are built here in the ship-yards. The market-day is Friday. Courts-leet and baron are held, though the general quarter-sessions were removed to Knutsford in 1784. The Independents and Wesleyan Methodists have meeting-houses in Northwich, and there has been a charity school for 12 poor children, with a small endowment, since 1735. The living is a curacy, in the archdeaconry and diocese of Chester. The church, which is spacious, has a semicircular choir, and the roof of the nave is decorated with numerous figures of wicker baskets, such as are used in salt-making.

Over, a small town, about four miles west of Middlewich, is governed by a mayor; but the commissioners appointed to make the recent inquiry into Municipal Corporations say that it does not appear under what warrant or authority the borough of Over is governed by a mayor, who is also a

justice of the peace within the limits of the borough and lordship. The population in 1831 was 2601.

Ecclesiastical and Legal Jurisdiction.—This county, in antient times, was subject to the ecclesiastical jurisdiction of the bishops of Mercia, who had their seat at Chester. In the time of William the Conqueror, and during three successive centuries, this diocese was styled the bishopric of Chester. (For further historical accounts, see Lysons and Ormerod.) Of these 86 parishes 46 are rectories, 23 vicarages, and 18 donatives, or perpetual curacies; many are of great extent. The parish of Prestbury comprises 32 townships and 14 chapelries. The county is in the diocese of Chester, and province of York: it forms an archdeaconry, and comprises the seven deaneries of Chester, Frodsham, Macclesfield, Nantwich, Malpas, Middlewich, and Wirrall. Cheshire is in the South Wales circuit.

Cheshire, before the Reform Act, sent four members to parliament: it is now formed into a north and a south division, each of which sends two members to parliament. The north division contains the hundreds of Macclesfield and Bucklow, and the south division contains the remaining hundreds.

The boroughs of Cheshire, Macclesfield, and Stockport, each return two members to parliament. The places of election for the north and south divisions respectively are Knutsford and Chester.

Manufactures.—The cotton and silk manufacture is extensively carried on in and around Stockport, Macclesfield, Marple, Congleton, and Sandbach. At Knutsford there is a large manufactory of thread. At Nantwich, and the places just named, are manufactories of hats for exportation, and of shoes at Sandbach. Some woollen cloths are also made in the same district. Tanning is very extensively carried on throughout the county. There is also a large manufacture of gloves, ribbons, and buttons. The copper, lead, and iron, of the Alderley Edge and Peckforton Hills, are manufactured in the county, and constitute a small item in the export trade. But cheese is the principal product, which is not only well known and highly esteemed in every part of England where the consumption is immense, but also in most parts of Europe. The whole annual produce of this article in Cheshire is about 11,500 tons, of which 4000 tons are exported. (Holland's *Agricul. Survey.*) The prime cheese is made chiefly in the districts where the salt abounds; that is, along the banks of the Weaver. Potatoes are raised in very large quantities, especially in the western portion of the county, including the peninsula of Wirrall. In the parish of Frodsham alone about 100,000 bushels are annually produced. Besides a prodigious home consumption, they are exported in great quantity by the Mersey to Liverpool and Manchester.

Civil History and Antiquities.—At the time of the Roman invasion this county formed part of the territory occupied by the Cornavii or Carnabii, a name which Whitaker conjectures the inhabitants of this district derived from the peculiar form of the peninsula between the æstuaries of the Dee and the Mersey. In the first division of Britain by the Romans it was included in Britannia Superior; and in their subsequent subdivision, it became part of Flavia Cæsariensis. The towns possessed by the Cornavii were Deva or Chester, Condate or Kinderton, Banchorium, Banchor, or Bangor, Etocetum or Wall, and Uriconium or Wroxeter; the last of which seems to have been their metropolis. Bangor, Etocetum, and Uriconium are not within the limits of Cheshire. Ormerod mentions a recent discovery of brass tablets, recording a grant of the freedom of the city of Rome to certain troops serving in Britain in the reign of Trajan, A.D. 98—117, some of whom at least may have been stationed near Bickly, where the tablets were found. From inscriptions which have been found, the twentieth legion appears to have continued at Chester as late as the third century, but to have withdrawn long before the final abandonment of the island in the fifth.

On the departure of the Romans, the Britons continued to hold Cheshire until about the year 607, when it was wrested from Brochmael, king of Powys, by the successful arms of Ethelfrid, the Saxon king of Bernicia. Prior to the battle, the Saxon troops are said to have massacred the monks of Bangor, against whom St. Augustine had denounced divine vengeance for their errors, and who aided the Britons with their prayers. Several of the British princes, however, having collected an army and marched to Chester, Ethelfrid was defeated in turn, and this district was not again subjected to the Anglo-Saxon power until about the year 828, when it was taken by King Egbert, and made a part of the kingdom of Mercia. According to Peter Langtoft, Athelwolf held his parliament at Chester after the death of Egbert, and there received the homage of his tributary kings 'from Berwick unto Kent.' About the close of 894, an army of Danes advancing from Northumberland took possession of Chester, and seized the fortress: the Saxons under Alfred, however, having arrived in the vicinity, by destroying the cattle and corn, and intercepting the provisions of the Danes, drove them to such extremities of famine, that they quitted the city and retreated to North Wales. Upon the division of England into three districts by Alfred, Cheshire was included in the Mercian jurisdiction. Cheshire acquired the privileges of a county palatine in the reign of William the Conqueror, who granted it to his nephew, Hugh d'Avranches, commonly called Hugh Lupus, to hold it as freely by the sword as he himself held the kingdom of England by the crown. Lupus created eight barons as soon as he felt himself established in his new dignity, who were bound to attend on him at his court and to furnish him with horses in war. In return for these services, they were invested with the right of holding courts on all pleas, suits, and plaints, and with the power of life and death. The last instance of the exertion of this last privilege occurred in 1597, when the baron of Kinderton's court tried and executed Hugh Stringer for murder. Until the final subjugation of the Welsh, the city of Chester was the usual place of rendezvous for the English army, and the county was exposed to all the evils of a border warfare. In 1237, on the death of John Scot, the seventh earl of Chester of the Norman line, without male issue, Henry III. gave the daughters of the late earl other lands in lieu of the earldom, being unwilling, as he said, to 'parcel out' so great an inheritance 'among distaffs:' the county he bestowed on his son Edward, who did not assume the title, but conferred it on his son Edward of Caernarvon, since which time the eldest sons of the kings of England have always held the title of earls of Chester. The inhabitants of Cheshire took a part in the rebellion of the Percies, and the greater part of the knights and esquires of the whole county, to the number of 200, with many of their retainers, fell in the battle of Shrewsbury, on the 22nd of July, 1403, from which date to the reign of Charles I., Cheshire was not the scene of any important military transactions. From the time of Henry III. to the reign of Henry VIII., the palatinate was governed as independently as it had been by the Norman earls. Henry VIII. however made it subordinate to the crown of England; 'yet,' says Gough, in his 'Additions to Camden,' 'all pleas of lands and tenements and all contracts within the county are to be heard and determined within it; and all determination out of it is deemed void, *et coram non judice*, except in cases of error, foreign plea, and foreign voucher; and for no crime but treason can an inhabitant of this county be tried out of it.' The county being solely under a distinct jurisdiction, and to a certain extent like a separate kingdom, never sent representatives to the English parliament, either for city or shire, until the reign of Edward VI., when, in the year 1549, on the petition of the inhabitants, two members were summoned from each. On the outbreaking of the civil war, as this county was nearly equally divided between the king and the people, the principal persons attempted to preserve its internal peace by a treaty of pacification, which was entered into at Bunbury under the sanction of the commissioners of array, but was rendered nugatory by an ordinance of parliament which required the inhabitants to assist the common cause. The parliament sent Sir William Brereton with a troop of horse, who took possession of Nantwich, which he fortified and made his head-quarters; while Sir Nicholas Byron, on the other side, being appointed colonel-general of Shropshire and Cheshire, and governor of Chester by the king, made it the head-quarters of the royalists. Lord Byron, the nephew of the governor, after successfully reducing several of the parliamentarian garrisons with his Irish regiments, defeated the whole parliamentary forces under Sir William Brereton at Middlewich, in the month of December, 1643. Nantwich, being now the only garrison in Cheshire in the possession of the parliament, was besieged during the greater part of January, 1644, until it was relieved by the united forces of Sir Thomas Fairfax and Sir William Brereton, who defeated Lord Byron and compelled him to retreat with the remains of his forces to Chester on the 25th. Prince

Rupert took Stockport without resistance on the 25th of May; but the royalists were defeated after a severe battle at Castle-heath, near Malpas, on the 25th of August. Next year, on the advance of the king to Chester with a large force, the parliament abandoned all their garrisons, except Tarvin and Nantwich, and, on the 27th of September, the battle of Rowton and Hooleheath was fought near Chester, in which the royalists were defeated; an event which led to the surrender of the garrison of Chester, in February, 1646, and the subjugation of the whole county to the parliament.

In August, 1659, Sir George Booth, having a secret commission from Charles II., appointing him commander-in-chief of all his forces in Cheshire, Lancashire, and North Wales, and being accompanied by several noblemen and gentlemen, appeared in Cheshire at the head of an army of upwards of 3000 men. They mustered on Rowton Heath, and published a declaration that they took up arms to deliver the nation from slavery and obtain a free parliament. The army of the parliament, under General Lambert, met them at Winnington Bridge, near Northwich, on the 16th of August, and soon defeated them. Booth himself, after making his escape from the field in disguise, was taken at Newport Pagnell and sent to the Tower; and Chester, which had been held by Colonel Croxton, surrendered immediately on the approach of the victorious army. The son of Sir George Booth, Lord Delamere, on the eve of the revolution, no sooner heard of the landing of the prince of Orange than he raised a considerable force in Cheshire and Lancashire, declared in his favour, and marched to join him; the Lords Molineux and Aston, with equal promptness, seized Chester for the king; but these warlike preparations were fortunately rendered useless by the abdication.

The Roman roads in the county are found in detached parts: one road, called the Watling-street, was probably more antient than the Roman times. This road enters Cheshire from the north by the ford over the Mersey at Stratford; the marks of the elevated crest, peculiar to the military roads of the Romans, are still visible. A little south-west of Bucklow Hill the roads seem to have divided, the Roman continuing towards Kinderton, and the British pursuing its old direction by Northwich over Delamere Forest, and by Chester to the coast of Caernarvonshire. The Roman road from Manchester to Kinderton crosses the ford of the Mersey, and proceeds to the village of Cross-street. It is seen in the enclosures about Oldfield Hall, and in a field beyond it is still raised several yards. In crossing the adjoining moss it is known by the name of Upcast, whence it runs by Dunham Park to a field called the Harbour-field, in the parish of Kinderton, which is the supposed station of *Condate*. Part of the Via Devana crossed the county from the S.E. to Chester. Besides these, antiquarian conjecture has pointed out several other Roman roads, but the evidence is not so satisfactory in their favour as in the cases of the roads we have traced. That there was a Roman station at Chester is universally admitted —the sites of the others are uncertain.

Besides the castle at Chester, which was built by William the Conqueror, and is now converted into the county-hall, jail, and barracks, there are several others. Beeston Castle, built in 1220, by Randle Blundeville, Earl of Chester, is upon the slope and summit of a sandstone rock, which forms on one side an almost perpendicular precipice of great height. The outer court is irregular in form, inclosing an area of about five acres. The walls are prodigiously thick, and have several round towers. A deep ditch, sunk in the solid rock, surrounds the keep; which was entered by a drawbridge, opposite two circular watch towers, still remaining. The approach within the great gateway between these towers is by rugged steps cut in the natural rock. Camden speaks of a draw-well, bored to the base of the rock, a depth of 90 yards, and communicating with a brook in the vale below. This castle has been in ruins since the civil war of Charles I., when it was dismantled. The others are Halton Castle, of which very few traces now remain; Aldford Castle, of which the foundations are still traced; Shocklach Castle, of which only some earth-works and a high mount are now to be seen; and Shotwick, which appears from the sketch of it in the British Museum to have had a pentagonal wall, with several circular towers inclosing a lofty square one. There are numerous antient mansion-houses. Smith, in his Treatise on Cheshire, calls this county 'the mother and the nurse of the gentility of England.' Another writer (*Harl. MSS.*, No. 1989) speaks of it as 'the seed-plot of gentry.'

Little Moreton Hall, in the parish of Astbury, is the most remarkable antient mansion in the county. The materials of the house are timber and plaster. The singular ornamental style of this very antient edifice, and the curious glazing of its large bay windows, are well exhibited in the plates of Lysons's *Magna Brit.*; Ormerod's *Cheshire*, vol. iii.; and Britton's *Architec. Antiq.*

Bramhall Hall, the antient seat of the Davenports, about two miles S.W. of Stockport, resembles that of Little Moreton. Ormerod's work contains a beautiful view of this mansion, vol. iii., p. 400.

Saighton Grange, near Chester, was one of the castellated residences of the Abbot of St. Werburg. (Ormerod, vol. ii., p. 240.)

Doddington Hall, the antient seat of the Delves family, is near the road from Nantwich to London. The modern, large, and sumptuous fabric was erected in 1780 by Samuel Wyat. It stands in a spacious park, and overlooks a fine sheet of water. Poole Hall, in the parish of Eastham, was built in the middle of the sixteenth century, and is one of the most venerable specimens of domestic architecture in this county. The style of the architecture is similar to that of all the antient Cheshire mansions, rising into pointed gables, with numerous large bay windows, and having the approach through a line of stables and cow-houses. Brereton Hall, which is in the style of Esher Place in Surrey, was built by Sir William Brereton, and the foundation stone is said to have been laid by Queen Elizabeth herself. The site is on a rising ground near the river Croke. Among the rich decorations of the interior is a curious painting of Queen Elizabeth in full costume, with chains of jewels hanging down to her waist, and with hair extremely red. Another object of great interest is the painted window, which has since been removed from this mansion to Ashton Hall in Warwickshire. Ormerod (vol. iii., p. 50) has given a large coloured drawing of this window, which contains nine full-length figures; the Saxon earls of Mercia, Leofwine and Leofric, and the seven Norman earls of Chester. They are all represented with hair and beards of a deep yellow. Dutton Hall stands on the ridge of a steep declivity overlooking the Weaver. It is surrounded by a broad and deep moat. The great hall is 40 feet by 20, and the whole edifice is a very sumptuous specimen of the domestic architecture of the sixteenth century. Crewe Hall, the seat of Lord Crewe, is an equally fine specimen of the seventeenth century, having been completed in 1636. It is a quadrangular building of red brick, with battlements and large projecting bay windows. An engraving is given in Ormerod, vol. iii., p. 168, and in Lysons's *Magna Brit.* The sculptured oak ornaments of the interior are curious, as well as the painted-glass window of the chapel. There are many portraits by Lely and others of that time. Britton, in his 'Architectural Antiquities,' has a fine drawing of a staircase in this mansion, remarkable for its form and decorations. The seat of Lord Combermere was an antient Cistercian abbey: it is beautifully situated on the margin of the large mere so called. The original edifice has been almost wholly renewed in the pointed Gothic style. Ormerod, vol. iii., p. 210.

Dunham Massey, the seat of the Earl of Stamford and Warrington, was rebuilt in 1730. It is a very spacious quadrangular building of brick, surrounded with a fine park of lofty old oaks, and is interesting for a curious gallery of paintings by Holbein, Lely, Vandyke, and other old masters. Cholmondeley Castle, the seat of the Marquis of Cholmondeley, is in the township of Cholmondeley, in Broxton hundred. The present magnificent modern edifice was built in 1804, on the site of the antient castle. The style of the architecture is the pointed Gothic; and, in approaching the eminence on which it stands, it has the appearance of an antient Norman fortress. The apartments are adorned with some rare and beautiful paintings. Eaton Hall, the seat of Earl Grosvenor, possesses great architectural grandeur, and resembles Cholmondeley Castle, in the pointed Gothic style. The surrounding park and pleasure grounds are laid out with great picturesque effect. Antient crosses occur at the boundary of Lyme Park, at Sandbach, at Oulton, and at Lymm. The crosses at Sandbach are referred by Lysons to a period not long subsequent to the introduction of Christianity among our Saxon ancestors. The sword of Hugh Lupus, the first Norman Earl of Chester, is preserved in the British Museum.

Statistics.—Population. Cheshire is both an agricultural and manufacturing county; in the first respect it ranked higher in 1811 than in 1831, being at the former date the 31st on the list of agricultural counties, and at the latter date, the 34th. Of 78,940 males, twenty years of age and upwards, inhabitants of Cheshire (in 1831), 23,527 were engaged in agricultural pursuits, and 13,305 in manufactures, or in making manufacturing machinery. Macclesfield Hundred is the principal manufacturing district of the county; in 1831 more than 6000 men were employed in manufacturing cotton and calico; nearly 1000 in the manufacture of silk, and about 5500 in manufacturing cotton and silk promiscuously. In Eddisbury and Northwich Hundreds, about 300 were employed in making salt.

The following summary of the population taken at the last census (1831) shows the number of inhabitants and their occupations in each hundred of the county.

HUNDREDS &c.	HOUSES. Inhabited.	Families.	Building.	Uninhabited.	OCCUPATIONS. Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other families not comprised in the two preceding classes.	PERSONS. Males.	Females.	Total of Persons.	Males, twenty years of age.
Broxton	2,953	3,123	10	88	2,012	604	507	8,201	8,214	16,415	4,087
Bucklow	7,849	8,271	36	280	2,944	3,264	2,063	21,631	21,311	42,942	10,718
Eddisbury	4,917	5,202	13	104	2,623	1,383	1,196	13,622	13,269	26,891	6,492
Macclesfield	21,792	23,454	201	1022	3,048	16,472	3,934	60,033	63,316	123,349	28,272
Nantwich	4,237	4,520	9	134	2,194	1,406	920	11,447	11,625	23,072	5,510
Northwich	7,065	7,473	26	254	1,638	3,757	2,078	19,022	19,127	38,149	9,044
Wirrall	3,296	3,544	66	253	1,458	1,080	1,006	9,537	9,563	19,100	4,570
Chester (city)	4,096	4,628	43	388	355	2,665	1,608	9,635	11,709	21,344	4,797
Macclesfield (town)	4,543	4,740	2	295	125	4,366	249	11,005	12,124	23,129	5,450
Totals	60,748	64,955	406	2818	16,397	34,997	13,561	164,133	170,258	334,391	78,940

The population of Cheshire at each of the four enumerations was:—

	Males.	Females.	Total.	Inc. per Cent.
1801	92,759	98,992	191,751	
1811	110,841	116,190	227,031	18·39
1821	132,952	137,146	270,098	18·99
1831	164,133	170,258	334,391	23·81

Showing an increase between the first and last periods of 142,640 persons, or 74½ per cent., which is 17½ per cent. beyond the general rate of increase throughout England.

County Expenses, Crime, &c.—The sums expended for the relief of the poor at the four dates of

1801 were £ 66,627 which was 6*s.* 11*d.* }
1811 „ 114,370 „ 10*s.* 0*d.* } for each inhabit-
1821 „ 104,081 „ 7*s.* 8*d.* } ant.
1831 „ 102,572 „ 6*s.* 2*d.* }

The sum expended for the same purpose in the year ending 25th March, 1834, was 92,640*l.*; and assuming that the population had increased at the same rate of per centage since 1831, as in the ten years preceding that period, the above sum gives an average of 5*s.* 1¾*d.* for each inhabitant. All these averages are below those for the whole of England and Wales.

The sum raised in Cheshire for poor's-rate, county rate, and other local purposes, in the year ending 25th March, 1833, was 141,492*l.* 19*s.*, and was levied upon the various descriptions of property as follows:—

	£.	s.	d.
On land	99,808	18	0
Dwelling-houses	29,416	13	0
Mills, factories, &c.	7,837	18	0
Manorial profits, navigation, &c.	4,429	10	0
	£141,492	19	0

The amount expended was—

For the relief of the poor	98,572	3
In suits of law, removal of paupers, &c.	7,480	17
For other purposes	37,687	10
	£ 143,740	10

In the returns made up for the year ending March, 1834, the descriptions of property assessed for local purposes are not distinguished: 138,228*l.* 16*s.* was raised in that year, and the expenditure was as follows:—

	£.	s.
For the relief of the poor	92,640	0
In suits of law, removal of paupers, &c.	8,569	12
For other purposes	37,105	18
Total	£ 1[illegible],315	10

The saving effected in the sums expended for the relief of the poor in 1834, as compared with the expenditure of 1833, is therefore rather more than 6 per cent.; the second item is, however, greater than that of the preceding year, reducing the whole amount of saving to about 3¾ per cent.

The number of turnpike-trusts in Cheshire, as ascertained in 1829, was 27; the number of miles of road under their charge was 349; the annual income arising from the tolls and parish composition was 16,525*l.*; and the annual expenditure 15,354*l.*

The county expenditure in 1834, exclusive of the relief for the poor, was 41,082*l.* 9*s.* 9*d.*, disbursed as follows:—

	£.	s.	d.
Bridges, buildings, and repairs, &c.	5,179	2	6
Gaols, houses of correction, &c., and maintaining prisoners, &c.	14,037	6	7
Coroner	488	13	0
Lunatic asylums	225	0	0
Expenses of prosecutions	9,570	3	2
„ clerks of the peace	737	14	3
„ conveyance of prisoners before trial	1,441	6	11
„ conveyance of transports	817	10	0
„ apprehending and conveying vagrants	395	19	4
„ high and special constables	628	5	2
„ debt—payment of principal and interest	5,614	9	7
„ miscellaneous	1,946	19	3

The number of persons charged with criminal offences in the three septennial periods ending with 1820, 1827, and 1834, were 1675, 2443, and 3862; making an average of 239 annually in the first period, of 349 in the second period, and of 552 in the third period. The numbers of persons tried at quarter-sessions in each of the years 1831, 1832, and 1833, in respect to which any costs were paid out of the county rates, were 377, 356, 398, respectively. Among the persons charged with offences, there were committed for

	1831.	1832.	1833.
Felonies	344	339	379
Misdemeanors	38	39	34

The total number of committals in each of the same years was 399, 403, and 431 respectively of whom

The number convicted was	332	330	367
„ „ acquitted	50	48	46
„ „ discharged by proclamation	17	25	18

At the assizes and sessions (in 1835), 533 persons were

charged with crimes in Cheshire; out of which number, 34 were charged with offences against the person, 10 of which were common assaults; 49 for offences against property committed with violence; and 389 for offences against property committed without violence. Of the remaining 61, there were 26 committed for riot, 21 for poaching, 2 for arson, 2 for uttering false money, 6 for perjury and unlawful oaths, 1 for killing and maiming cattle, 1 for forgery, and 2 for keeping disorderly houses. Of those committed, 411 were convicted, and 122 acquitted, or no bills were found against them. The greater part of the punishments awarded to those convicted was very slight: 231 were sentenced to imprisonment for six months or under; 56 for one year or under; 17 for two years, and 1 for three years; 4 were fined, and 7 were discharged on sureties. Of the remaining 95, 18 were sentenced to death, which sentence was commuted to transportation or imprisonment; and 77 were sentenced to transportation for various periods. Of the offenders, 461 were males, and 72 females. Among the whole number, 205 could read and write, 155 could read only, 167 could neither read nor write, and the degree of instruction of 6 could not be ascertained. The proportion of the offenders to the population in 1835 was 1 in 627.

The number of persons qualified to vote for the county members of Cheshire is 10,235, being 1 in 23 of the whole population, and 1 in 5 of the male population above 20 years of age. The expenses of the last election of county members to parliament, were to the inhabitants of the county, 415*l.* 15*s.* 6*d.*, and were paid out of the general county rate.

There are ten savings-banks in this county. The number of depositors and amount of deposits on the 20th November, 1832, 1833, 1834, and 1835 respectively, were:—

	1832.	1833.	1834.	1835.
Number of depositors .	8853	9262	10,089	10,985
Amount of deposits .	£327,647	332,483	356,334	381,872

The various sums placed in the savings-banks in 1834 and 1835 were distributed as under:—

	1834.		1835.	
£	Depositors.	Deposits.	Depositors.	Deposits.
Not exceeding 20 .	4,774	£34,140	5,291	£ 36,280
„ 50 .	3,005	93,097	3,315	103,075
„ 100 .	1,403	96,344	1,517	105,536
„ 150 .	526	64,355	531	67,608
„ 200 .	315	51,507	288	56,184
Above 200 .	66	16,891	43	13,159
Total .	10,089	£356,334	10,985	£381,872

Education.—The following particulars are obtained from the parliamentary inquiry on education made in the session of 1835:—

	Schools.	Scholars.	Total.
Infant Schools	51		
Number of infants at such schools, ages from 2 to 7 years:—			
Males		547	
Females . . .		629	
Sex not specified		342	
			1518
Daily Schools	845		
Number of children at such Schools, ages from 4 to 14 years:—			
Males		14,210	
Females . . .		11,698	
Sex not specified		4,733	
			30,681
Schools .	896		
Total of children under daily instruction .			32,199
Sunday Schools.	363		
Number of children at such Schools, aged from 4 to 15 years:—			
Males		25,314	
Females		26,831	
Sex not specified		4,827	
			56,972

Assuming that the population between 2 and 15 years increased in the same ratio as the whole of the population between 1821 and 1831, and has continued to increase in the same ratio since, we find that there must have been living in Cheshire (in 1834) 117,243 persons between those ages. A very large number of the scholars attend both daily and Sunday schools; thirty-nine schools, containing 3573 children, are returned from various places as attending both daily and Sunday schools, and there are a still greater number not specified; in what proportion the duplicate entry of children is thus produced is therefore uncertain, but we may conclude that not two-thirds of the children receive instruction.

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars.		Subscrip. and payment from scholars.	
	Schls	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	1	6	3	180	43	1,100	4	232
Daily Schools	92	3941	61	3,744	663	20,003	29	2993
Sunday Schools	9	877	343	54,985	1	86	10	1024
Total...	102	4824	407	58,909	707	21,189	43	4249

The schools established by Dissenters, included in the above statement, are:—

	Schools.	Scholars.
Infant Schools	..	..
Daily Schools	17	1,303
Sunday Schools	165	28,572
The Schools established since 1818 are:		
Infant and other daily schools .	531	16,686
Sunday Schools	290	44,894

Forty-eight boarding-schools are included in the number of daily schools as given above.

No school in this county appears to be confined exclusively to the children of parents of the established church, or of any other religious denomination. Such exclusion is disclaimed in almost every instance, especially in schools established by Dissenters, together with schools for the children of Roman Catholic parents.

Lending libraries of books are attached to eighty-three schools in Cheshire.

CHE'SNE, ANDRE' DU, born in 1584 in the province of Touraine, became distinguished for his historical and philological erudition, and was one of the most learned men of France in his age. The work for which he is best known is his valuable collection of the oldest French chroniclers 'Historiæ Francorum Scriptores coætanei, ab Gentis Origine usque ad Philippi IV. tempora,' of which he edited 4 vol. fol., and his son, François du Chêsne, edited the 5th after his father's death. He also published: 2. 'Histoire des Rois, Ducs, et Comtes de Bourgogne et d'Arles,' 2 vol. 4to. 3. 'Histoire des Cardinaux Français.' 4. 'Bibliotheca Cheniacensis.' 5. 'Bibliothèque des Auteurs qui ont écrit l'Histoire et Topographie de la France.' 6. 'Histoire des Papes,' 2 vol. fol. 7. 'Histoire généalogique des Maisons de Luxembourg, de Montmorency, Vergy, Guisnes, Châtillon, Béthune, &c.,' 7 vol. fol., besides a History of England in 2 vol. fol., Paris, 1634. Duchesne died in 1640 near Paris. He has been called the father of French history.

CHESS, to adopt the definition of Dr. Johnson, is 'a nice and abstruse game, in which two sets of men are moved in opposition to each other.' The best method of learning the names of the pieces, with their moves, and the manner of placing them at the beginning of the game, is to take an hour's lesson from a friend; and we will therefore pass over this part of the alphabet of the game, to make room for more interesting matter; premising, however, two points, which are often unknown to drawing-room as distinguished from club-players. The first is, that though every pawn may be moved two squares at its first move, it may be taken by any pawn which could have taken it, had it moved but one square; and the pawn in such case is said to be taken *en passant*. Thus, suppose the white queen's bishop's pawn to have advanced to the adversary's queen's bishop's fourth square, and the black queen's knight's pawn to be at its own square; if the black should move his queen's knight's pawn two squares, the white may take it with his queen's bishop's pawn, and the white pawn is placed at the black queen's knight's third square, just as if the black pawn had been moved one square only. The second point is, that when a pawn has reached the last square on the adverse side of the board, it becomes a queen, rook, bishop, or knight, as the player to whom it belongs may choose; nor is this privilege limited, as common players often suppose, to cases where the first queen or rook, &c., has been lost.

Notation used in chess.—The board is supposed to be divided into two equal parts, one of which belongs to the white, the other to the black player. The square on which the king stands is called the king's square; the one in front

of it the king's second square, the next in front of that the king's third square; then the next the king's fourth square; the next again is called the king's fifth square, or the adversary's king's fourth square, and so on. The bishop standing next to the king is called the king's bishop; the square on which it stands the king's bishop's square; the next square in front is the king's bishop's second square, and so on. In like manner we have the king's knight's square, the king's rook's square, the queen's square, the queen's bishop's square, the queen's knight's square, and the queen's rook's square; and each master-piece gives its name to the other squares on its file. The pawns too take their names from the pieces before which they stand, and are called the king's pawn, the queen's pawn, the king's bishop's pawn, the king's rook's pawn, &c. Suppose we wished to describe a situation in which the queen's pawn was in its original position; we might say that it was at its square, or at queen's second square. If it had been moved one square, we might say that it was at its third square, or at the queen's third square; the former phrase is not strictly accurate, but is sanctioned by the best writers.

This notation, however, is commonly employed in a more compendious form; thus K. stands for king, Q. for queen, R. for rook, B. for bishop, Kt. for knight, P. for pawn, sq. for square, adv. for adversary's, chg. for checking; observing K. may stand for king's as well as king, Q. for queen's, &c. Q. Kt. stands for queen's knight, Q. Kt. P. for queen's knight's pawn, and so on.

There is another method of notation frequently employed by continental writers, which consists in using the first eight letters of the alphabet to designate the eight files, and the first eight figures to designate the squares of those files; thus P. E. 4 means that the player of the white pieces has moved his king's pawn two squares, and P. E. 5 denotes the same move for the black. This notation is shorter than even the most abbreviated form of the first-mentioned one; but it is perplexing and difficult to follow, from its being based on a less natural division of the board.

We may here observe that the ranges of squares running from right to left are called *ranks*, and those running from one player to the other are called *files*; the lines sloping obliquely across the board are termed *diagonals*.

TECHNICAL TERMS. *Castling*. This is a combined move of the king and rook, which is allowed once in the game. The method of castling is as follows: first, with the K. R., the R. must be placed on the K. B. square, and the K. at K. Kt. square; secondly, with the Q. R., the R. must be placed on the Q. square, and the K. on Q. B. square. The space between the king and rook must be unoccupied; neither the king nor the rook must have moved; and the squares over which the king moves must not be attacked at the time by any adverse piece.

Check signifies an attack made on the king by a piece or pawn. A *check by discovery* is when the king is attacked not by the piece that moves, but by one which is behind it; for example, place the white king at his own square, black queen at her king's square, and a black knight at adv. king's third square; by playing the knight to adv. king's knight's fourth square, you give *check by discovery* with the queen; if you play the knight to adv. queen's bishop's second sq., or king's knight's second sq., you give *double check*.

A perpetual check consists in an alternation of checks, from each of which the adverse king escapes only to be subjected to the other. Thus suppose the pieces to be in the following situation:—

Black.	*White.*
K. at K. Kt. sq.	K. at K. R. sq.
P. at K. Kt. 2 sq.	Q. at K. sq.
Q. at adv. Q. R. 2 sq.	
R. at adv. Q. R. 3 sq.	

In this critical position, white having the move can draw the game by checking at adv. K. sq., and then at adv. K. R. fourth sq., and again at adv. K. sq., and so on *ad infinitum*.

Checkmate. When the king is attacked and cannot move out of check, take the piece that checks him, or interpose any piece, he is said to be *checkmated*, and the game is won by the player who gives the *checkmate*. In other words, when the king is so attacked that he would inevitably be taken, if he were not king, he has lost the game.

Doubled Pawn. When two pawns of the same colour are on the same file, the more advanced one is called a doubled pawn; thus if there is a pawn on K. R. second sq., and another on K. R. third sq., the latter is called a doubled pawn.

Drawn Game. When neither party can checkmate the other, the game is drawn. This may happen in many ways; first, if the force remaining on the board is not sufficient to checkmate, as if you have only your king and a bishop, or a knight, or both knights, against the adverse king; secondly, when you have sufficient force, but are unable to checkmate with it: the twenty-second law in Lewis's 'Elements' bears upon this point, and is as follows—'As the game is drawing to a conclusion, if one of the players remain with a rook and bishop against a rook, with both bishops, or with a knight and bishop against a king, he must checkmate his adversary in fifty moves on each side at most; for if at the expiration of fifty moves checkmate be not effected, the game must be considered as drawn,' &c. &c.* Thirdly, by a perpetual check on the adverse king; fourthly, when both players act on the defensive, and abstain from attacking the adversary; fifthly, when both players have an equal but small force, as a rook or queen; and sixthly, when one of the kings is stalemated.

Exchange—To gain the. When a player obtains a rook for a bishop or knight, he is said to gain the exchange, a rook being more valuable than a knight or a bishop.

Gambit. This word is derived from the Italian *gambetto*, a tripping up of the heels; the King's Gambit begins in the following manner:

White.	*Black.*
1. K. P. 2 sq.	1. K. P. 2 sq.
2. K. B. P. 2 sq.	

If black abstains from taking the offered pawn, he is said to refuse the gambit.

The following moves constitute the Queen's Gambit:

White.	*Black.*
1. Q. P. 2 sq.	1. Q. P. 2 sq.
2. Q. B. P. 2 sq.	

Stamma, a native of Aleppo, who published a good analysis of this opening, called it the gambit of Aleppo, an appellation which was afterwards adopted by Philidor.

The sacrifice of the knight in the following manner constitutes the Muzio Gambit, which is perhaps the most brilliant opening hitherto invented:

Black.	*White.*
1. K. P. 2 sq.	1. K. P. 2 sq.
2. K. B. P. 2 sq.	2. P. takes P.
3. K. Kt. to K. B. 3 sq.	3. K. Kt. P. 2 sq.
4. K. B. to Q. B. 4 sq.	4. K. Kt. P. 1 sq.
5. Castles.	5. K. Kt. P. takes Kt.

The Salvio and the Cunningham Gambit are likewise varieties of the King's Gambit. The Lopez Gambit, in which the K. B. P. is not sacrificed until the fourth or fifth move, begins in the following or some similar manner:

White.	*Black.*
1. K. P. 2 sq.	1. K. P. 2 sq.
2. K. B. to Q. B. 4 sq.	2. K. B. to Q. B. 4 sq.
3. Q. to K. 2 sq.	3. Q. P. 1 sq.
4. K. B. P. 2 sq.	

In the Bishop's Gambit, the first player moves K. B. to Q. B. 4th square at his third move, instead of K. Kt. to K. B. 3rd square.

Minor Piece is an appellation common to the bishop and knight.

Passed Pawn. A pawn is called *passed* when it is no longer obstructed by any adverse pawn on its own file, or either of the adjoining ones.

Stalemate. This name is given to the termination of the game, when the player whose turn it is to move has his king so placed, that though not in check he cannot move without going into check, and there is nothing else to play. The game is then drawn. It was formerly the law among English players, that the player whose king was stalemated won the game, and many uninstructed players imagine this to be the case still; but the rule has long since been altered, with great propriety. The following is an example of a stalemate:

* Of the checkmates mentioned in the text, that with the bishop and knight is remarkably difficult; that with the two bishops very easy; and that with rook and bishop against rook uncertain. Philidor asserted that it could always be forced; but succeeding writers, among whom we may mention Mr. Lewis (*Chess Lessons*, vol. ii. p. 304), believe that in any indifferent position the game is drawn.

White.	*Black.*
1. K. at K. R. sq.	1. K. at K. R. sq.
	2. Q. at adv. K. B. 2 sq.

White has the move, and is consequently stalemated.

This is the case likewise in the following position :

White.	*Black.*
1. K. at K. R. sq.	1. K. at K. R. sq.
2. B. at K. R. 2 sq.	2. Q. at adv. K. B. 2 sq.
	3. R. at K. R. 2 sq.

White is to move; he cannot move the king without going into check of the queen, nor can he move the bishop without exposing himself to check of the rook ; he is consequently stalemated. The student who is desirous of seeing remarkable positions where the game is drawn by stalemate, will find them in Lewis's edition of *Sarratt*, pp. 108, 111, 152, 153, 154, 172; in Lewis's *Stamma*, situations 97, 98, 99, 100; and in Lewis's *Chess Problems*, situations 89 and 95.

The following games will exemplify many of the preceding laws and definitions ; the fourth is one of the match games played between the London and Edinburgh clubs, in the years 1824—28 :

Game 1 (*Fool's Mate*).

Black.	*White.*
1. K. B. P. 1. sq.	1. K. P. 2 sq.
2. K. Kt. P. 2 sq.	2. Q. to adv. K. R. 4 sq. Checkmating.

Game 2 (*Scholar's Mate.*)

White.	*Black.*
1. K. P. 2 sq.	1. K. P. 2 sq.
2. K. B. to Q. B. 4 sq.	2. K. B. to Q. B. 4 sq.
3. Q. to adv. K. R. 4 sq.	3. K. Kt. to K. B. 3 sq.
4. Q. takes K. B. P. Checkmating.	

Black's third move ought to have been Q. to K. second square.

Game 3 (*A Gambit from Greco*).

White.	*Black.*
1. K. P. 2 sq.	1. K. P. 2 sq.
2. K. B. P. 2 sq.	2. K. P. takes P.
3. K. Kt. to K. B. 3 sq.	3. K. Kt. P. 2 sq.
4. K. B. to Q. B. 4 sq.	4. K. B. P. 1 sq.
5. K. Kt. takes K. Kt. P.	5. P. takes Kt.
6. Q. to adv. K. R. 4 sq. chg.	6. K. to his 2 sq.
7. Q. takes K. B. P. and checks.	7. K. to his sq.
8 Q. to adv. K. R. 4 sq. chg.	8. K. to his 2 sq.
9. Q. to adv. K. 4 sq., and checkmates.	

Black's fourth move was a very bad one ; he ought to have played either K. B. to K. Kt. 2 square, or K. Kt. P. 1 square: having committed this mistake, however, he should have played K. R. P. 2 squares at his fifth move, instead of taking the Kt. The pawn which white takes at his 7th move, having been just before on the bishop's file, retains the name of K. B. P., though it might also be called K. Kt. P. If black at his 7th move were to interpose K. Kt., white would checkmate on the move by playing Q. to adv. K. 4th sq.

Game 4.

London. *White*	*Edinburgh.* *Black.*
K. P. 2 sq.	1. K. P. 2 sq.
2. K. Kt. to K. B. 3 sq.	2. Q. Kt. to Q. B. 3 sq.
3. Q. P. 2 sq.	3. K. P. takes P.
4. K. B. to Q. B. 4 sq.	4. K. B. to Q. B. 4 sq.
5. Q. B. P. 1 sq.	5. Q. to K. 2 sq
6. K. castles.	6. P. takes P.
7. Q. Kt. takes P.	7. Q. P. 1 sq.
8. Q. Kt. to adv. Q. 4 sq.	8. Q. to her 2 sq.
9. Q. Kt. P. 2 sq.	9. Q. Kt. takes P.
10. Q. Kt. takes Kt.	10. K. B. takes Kt.
11. K. Kt. to adv. K. Kt. 4 sq.	11. K. Kt. to K. R. 3 sq.
12. Q. B. to Q. Kt. 2 sq.	12. K. to K. B. sq.
13. Q. to Q. Kt. 3 sq.	13. Q. to K. 2 sq.
14. K. Kt. takes K. B. P.	14. K. Kt. takes Kt.
15. Q. takes K. B.	15. K. Kt. to K. 4 sq.
16. K. B. P. 2 sq.	16. Kt. takes K. B.
17. Q. takes Kt.	17. Q. to K. B. 2 sq.

Game 4,—*continued.*

London. *White.*	*Edinburgh.* *Black.*
18. Q. to Q. B. 3 sq.	18. Q. B. to K. 3 sq.
19. K. B. P. 1 sq.	19. Q. B. to adv. Q. B. 4 sq.
20. K. R. to K. B. 4 sq.	20. Q. Kt. P. 2 sq.
21. K. P. 1 sq.	21. P. takes P.
22. Q. takes P.	22. K. R. P. 1 sq.
23. Q. R. to K. sq.	23. K. R. to K. R. 2 sq.
24. K. B. P. 1 sq.	24. K. Kt. P. 2 sq.
25. K. R. to adv. K. B. 4 sq.	25. Q. R. P. 2 sq.
26. Q. to adv. Q. B. 4 sq. chg.	26. K. to K. Kt. sq.
27. K. R. takes P. chg.	27. P. takes R.
28. Q. takes P. chg.	28. K. to K. B. sq.
29. B. to Q. 4 sq.	29. B. to K. 3 sq.
30. Q. to adv. Q. B. 4 sq. chg.	30. K. to K. Kt. sq.
31. Q. to adv. K. Kt. 4 sq. chg.	31. K. to K. B. sq.
32. Q. B. checks.	32. K. to his sq.
33. Q. to adv. Q. 4 sq.	33. Q. R. to its 3 sq.
34. Q. to adv. Q. Kt. 2 sq.	34. Q. to K. R. 4 sq.
35. K. B. P. checks.	35. K. takes P.
36. R. to K. B. sq. chg.	36. K. to Kt. 3 sq.
37. Q. to K. 4 sq. chg.	37. Bishop interposes.
38. Q. to adv. K. sq. chg.	38. Rook interposes.
39. Q. to adv. K. Kt. sq. chg.	39. K. to K. B. 3 sq.
40. K. Kt. P. 2 sq.	40. Q. R. to its sq.
41. Q. takes Q. R.	41. Q. takes P. chg.
42. K. to K. R. sq.	42. R. to Q. 2 sq.
43. B. to Q. R. 3 sq.	43. K. to K. B. 2 sq.
44. Q. to adv. Q. B. 3 sq.	44. R. to adv. Q. sq.
45. Q. takes Q. Kt. P.	45. Q. to adv. K. 4 sq. chg.
46. K. to K. Kt. sq.	46. K. to K. Kt. 3 sq.
47. Q. to Q. Kt. 2 sq.	47. Q. to adv. K. Kt. 4 sq. chg.
48. Q. to K. Kt. 2 sq.	48. Q. takes Q. chg.
49. K. takes Q.	49. B. to adv. K. R. 3 sq. chg.
50. K. takes B.	50. R. takes R.
51. B. to adv. K. 2 sq.	51. Q. R. P. 1 sq.
52. Q. R. P. 1 sq.	52. R. to K. B. 4 sq.

The London club resigned the game.

The London club had the game in their hands until the unfortunate though ingenious sacrifice of the rook at the twenty-seventh move. They might have won, at the twenty-fourth move, by checking with Q. at adv. Q. B. 4 sq., and then playing Q. R. to adv. K. 2 sq., as Mr. Lewis has demonstrated in his excellent edition of the match games, p. 30, *et seq.:* or they might have won at the twenty-sixth move, by playing B. to Q. 4 sq., as Mr. Lewis has shown in his 'Remarks on the Report of the Committee of the Edinburgh Chess Club,' p. 7, *et seq.* Even after the sacrifice of the rook, London might have drawn the game by a perpetual check, by checking again with Q. at adv. Q. B. 4 sq., at the 32 move, and then at adv. K. Kt. 4 sq., &c.

History and Literature of the Game. The game of chess is of great antiquity, and appears to have been invented in China or Hindostan. Sir William Jones inclines to the latter supposition. In the second volume of the 'Asiatic Researches,' he says, 'We may be satisfied with the testimony of the Persians ; who, though as much inclined as other nations to appropriate the ingenious inventions of a foreign people, unanimously agree that the game was imported from the west of India in the sixth century of our æra. It seems to have been immemorially known in Hindostan by the name of *Chaturanga, i.e.*, the four *angas*, or members of an army ; which are these, elephants, horses, chariots, and foot-soldiers ; and in this sense the word is frequently used by epic poets in their descriptions of real armies. By a natural corruption of the pure Sanscrit word, it was changed by the old Persians into *chatrang ;* but the Arabs, who soon after took possession of their country, had neither the initial nor the final letter of that word in their alphabet, and consequently altered it further into *shatranj*, which found its way presently into the modern Persian, and at length into the dialects of India, where the true derivation of the word is known only to the learned. Thus has a very significant word in the sacred language of the Brahmins been transformed by progressive changes into *axedrez, scacchi, echecs, chess ;* and by a whimsical concurrence of circumstances has given birth to the English word *check*, and even a name to the *exchequer* of Great Britain.' He speaks also of 'the *rat'h*, or armed chariot, which the Bengalese pronounced *rot'h*, and which the Persians changed into *rokh*, whence came the *rook* of some European nations ;

as the *vierge* and *fol* of the French are supposed to be corruptions of *ferze* and *fil*, the prime minister and elephant of the Persians and Arabs.'

It is perfectly clear that chess was not known to the Greeks or Romans; indeed it is commonly supposed not to have been introduced into Europe till the time of the Crusaders; though there is a set of Latin verses in Hyde, describing the game, which is said to have been written during the time of the Saxons, and therefore a good number of years before the first crusade. Several points in which the eastern game now differs from ours were then observed in Europe. The following are the peculiarities of the Hindostanee game, as given by a native player:

'1. In the Hindostanee game the king is placed to the right hand, so that the king of one party is opposite the queen of the other.

'2. There are three modes of winning the game. The first called Boorj, when the losing party has no piece left on the board—the game is then discontinued. This mode of winning is reckoned the least creditable, and in many parts it is deemed a drawn game. The second is by checkmate with a piece, when the losing party must have one or more pieces remaining. The third is by checkmate with a pawn (pied-mât), the losing party having one or more pieces remaining. This last shows the greatest superiority.

'3. Stalemate is not known in the Hindostanee game; if one party get into that position the adversary must make room for him to move. In some part of India he that is put in this predicament has a right to remove from the board any one of the adversary's pieces he may choose.

'4. No party can make a drawn game by an universal [perpetual] check; he that has the option must adopt some other move.

'5. The pawns on reaching the last square of the board are transformed into the master piece of that file, except the king's pawn, which becomes a queen. If the pawn be on the knight's file, the knight immediately on being made takes one move in addition to the last move of the pawn, unless some other piece command the square to which the pawn was advancing.

'6. No pawn can be pushed up to the last square of the board, nor take any piece on that line, so long as the master piece of that file remains.

'7. The king does not castle, but is allowed the move of a knight once in the game, not however to take any piece—nor can he exercise this privilege after having been once checked.

'8. The two royal pawns and those of the two rooks are allowed to move two squares each at first, so long as their pieces remain at their squares. The other pawns move only one square at a time.

'9. At the beginning of a game, four or eight moves, as may be determined, are played up on both sides. This in a great measure prevents unnecessary exchanges till a general disposition is adopted and the pieces brought out.

'10. The first move at the beginning of a match is arbitrary; afterwards he that has won most games moves first.' (*Essays on Chess, adapted to the European mode of Play; consisting principally of Positions or critical Situations, calculated to improve the Learner and exercise the Memory.* By Trevangadacharya Shastree. Translated from the original Sanscrit. Bombay. 1814.)

In the Latin verses above mentioned, the queen is directed to be placed on the right hand of the king, and therefore the queen of one party will be opposite the king of the other, as in India.

'Rex paratus ad pugnandum, primum locum teneat,
Ejus atque dextrum latus Regina possideat.'

Other peculiarities mentioned by Trevangadacharya Shastree are found in the older European writers. Thus he says that the king does not castle; and there is no example of castling in Sarratt's translation of 'Damiano.' Again, the king once in the game may move like a knight; and we find instances of this singular privilege in Sarratt's 'Ruy Lopez,' p. 97; in his 'Gianutio,' p. 5; and in his 'Gustavus Selenus,' p. 41.

Other Hindostanee modes are still preserved at Stroebeck, a village of chess-players near Halberstadt, of which Mr. Lewis has given a very interesting account. Our Indian tells us that four or eight moves are played up on each side; and in one of his games the same moves are played by both parties seventeen times! At Stroebeck, in like manner, 'The pieces being placed as usual, each party is obliged to play his king's rook's pawn, queen's rook's pawn, and queen's pawn two squares, and the queen to her third square.' (Lewis's *Chess Lessons*, second series, p. 416.) And as in India, the privilege of moving two squares is restricted to the pawns of the king, queen, and rooks, so at Stroebeck it is confined to those of the queen and rooks. At Stroebeck too castling is not allowed, but Mr. Lewis was informed that some players have lately permitted it.

The villagers possess a chess-board which was presented to them by the elector of Brandenburg, on the 13th of May, 1651; 'on the other side the board is divided into 96 squares (12 by 8); this is intended for the courier game, which is played with the usual chess-men, to which are added, for each player, four pawns, two couriers, a man, and a fool, which last two are now called state counsellors.' (Lewis's *Chess Lessons*, second series, p. 414.)

In this game, which has been played at Stroebeck from time immemorial, another one of the antique rules of chess appears to be preserved. In the courier game the move of the bishop is confined to the second square from the one on which he stands; thus, a bishop placed on the king's 4 sq. can be played only to K. Kt. 2 sq., Q. B. 2 sq., Q. B. 6 sq., or K. Kt. 6 sq.; and in the Latin verses above quoted, we are told that 'Cædit calvus per transversum tertiam ad tabulam,' that is to say, 'the bishop attacks the third square in an oblique direction;' the square on which he stands being included in the three, according to the old way of reckoning; just as Damiano, for instance, talks of a pawn moving *three* squares; and Mr. Lewis, adopting this mode, speaks of the bishop's move in the courier game, being limited to *three* squares.

The reader who is inclined to investigate the history of Chess may consult Hyde's treatise, 'Mandragorias, seu Historia Shahiludii. Oxoniæ, 1694;' 'Leibnitzii, Annotatio de quibusdam Ludis,' &c., in 'Misc. Soc. Reg. Berol.,' t. i., an. 1710: the historical disquisition on the game of Chess, by Daines Barrington, in the 9th vol. of the 'Archæologia;' Sir William Jones's 'Essay,' in the 2nd vol. of the 'Asiatic Researches;' and a paper, by Mr. Eyles Irwin, in the 'Transactions of the Royal Irish Academy.' Twiss's work, entitled 'Chess,' 2 vols., 8vo., is an amusing repertory of anecdotes of chess-players, accounts of chess-books, and passages relating to the game, extracted from an infinity of authors.

Jacopo Dacciesole, a Dominican friar, wrote a treatise on Chess before the year 1200, entitled 'Solatium Ludi Scacchorum, scilicet Libellus de Moribus Hominum et Officiis Nobilium.' This was a book of great reputation for several centuries. Caxton's work on Chess, printed in 1474, was a translation from a French translation of Dacciesole's Treatise. The object of the writer however is rather to teach morals than Chess: he merely gives the moves, and then treats of the duties of the various ranks represented by the chess-men. Thus, in Caxton, 'The thirde chapitre of the seconde tractate treteth of the alphyns, ther offices, and maners. The alphyns ought to be made and formed in manere of juges syttynge in a chayer, with a book open to fore their eyen,' &c.

And then comes an account of the offices of these judges, one of whom is supposed to sit in criminal, and the other in civil cases. The alphyn, we may remark, is the bishop.

Catalogue of chess writers in chronological order:—

The earliest practical writer on Chess is Lucena, whose treatise came to light only a few years since. It is entitled 'Arte breue, e introduccion muy necessaria para saber jugar al Axedres, con ciento y cincuente Juegos de partido.' Salamanca, 4to., about 1495.

His book was copied by Damiano, who published a treatise at Rome in 1512, entitled 'Libro da imparare giuocare a Scacchi,' &c., 4to. There is another edition, printed at Rome in 1524*.

Ruy Lopez. 'Libro de la invencion liberal y arte de juego del Axedres, &c. En Alcara de Henares,' 1551, 4to.

Gianutio (Horatio). 'Libro nel qualo si tratta della maniera di giuocar a' Scacchi, con alcuni sottilissimi partiti.' Turino, 1597. 4to.

* It is a curious fact in literary history, that Damiano's work was in its turn copied without acknowledgment; in the quaint language of Bingham's translation of Ponziani, 'Of the eighty-eight parties by this author [Damiano] nine or ten are very ingenious, not so the others. We, nevertheless, must believe, that all alike excessively struck the fancy of Dr Antonio Porto, who, with admirable frankness, caused them to be reprinted under his own name, without adding the smallest particle to them himself; as may be seen by the two editions, one printed at Bologna, by Gio. Rossi, in 1606, the other at Venice, by Peter Farri, in 1618.' p. 63.

Salvio (Alessandro). 'Trattato dell' invenzione e dell' arte liberale del giuoco degli Scacchi.' Nap. 1604, 1612, 1618; e diviso in lib. vj., per Gio. Dom. Montanaro, 1634. 'Discorso sopra il giuoco degli Scacchi con la sua Apologia contro il Carrera,' 1634, 1723. 4to.

——— 'Il Puttino, ossia il cavaliere errante sopra il giuoco de' Scacchi,' &c. Nap. 1634. 4to.

Selenus (Gustavus.) 'Das Schach oder Koenig-Spiel. Lips.,' 1616, folio. (This book was written by the duke of Brunswick.)

Greco (Gioachino). 'Trattato di nobilissimo e militare esercitio de' Scacchi.' (We do not know the date of this work, but that of the earliest French translation is 1615.)

Carrera (Pietro). 'Del giuoco degli Scacchi,' &c. Militelli, 1617. 4to.

Bertin (Capt.) 'The noble game of Chess.' London, 1735. 12mo.

Stamma (Philippe). 'Essai sur le jeu des Échecs,' &c. Paris, 1737. 12mo.

Philidor (A. D.) 'Analyse du jeu des Échecs,' &c. Londres, 1749. 8vo.

Rio (Ercole Del). 'Osservazioni pratiche sopra il giuoco degli Scacchi.' 4to. Modena, 1750. (This is the celebrated anonymous Modenese.)

Lolli (Giamb). 'Osservazioni teorico pratiche sopra il giuoco degli Scacchi.' Bologna, 1763. Folio.

Cozio (il Conte Carlo). 'Il giuoco degli Scacchi.' Torino, 1766. 2 vols., 8vo.

Ponziani (Domenico Canonico). 'Il giuoco incomparabile degli Scacchi,' &c. Modena, 1769. 4to. There is an English translation of this work by Bingham.

'Traité théorique et pratique du jeu des Echecs, par une société des amateurs.' Paris 1775 and 1786.

'Les Stratagèmes des Echecs,' 2 tom. 16mo. Paris. An. X. There is an English translation of this work by Kenny.

Allgaier. 'Neue theoretisch-practische Anweisung zum Schachspiele.' 8vo. Wien, 1811.

Koch (J. F. W.) 'Codex der Schachspielkunst.' 2 vols., 8vo. Magdeburg, 1813.

Sarratt (J. H.) 1. 'Treatise on the game of Chess.' 2 vols., 8vo. London, 1808.

2. 'Translation of the works of Damiano, Ruy Lopez, and Salvio, on the game of Chess.' 8vo. London, 1813.

3. 'Translation of the works of Gianutio and Gustavus Selenus.' 2 vols., 8vo. Lond., 1817.

4. 'New Treatise on the game of Chess,' upon a plan of progressive improvement hitherto unattempted. 2 vols., 8vo. Lond., 1821.

Trevangadacharya Shastree. 'Essays on Chess, adapted to the European mode of play,' &c. Bombay, 1814.

'A selection of fifty games, played by the automaton chess-player.' London, 1820. (Pawn and move are given by the automaton in all these games.)

Cochrane. 'A Treatise on the game of Chess; containing the games on odds, from the "Traité des Amateurs;" the games of the celebrated anonymous Modenese; a variety of games actually played; and a catalogue of writers on Chess.' Lond. 8vo. 1822.

Silberschmidt. 'Das Gambit, oder Angriff und Vertheidigung gegen Gambitzüge,' &c. Brunswick, 1829. 8vo.

Mauvillon. 1. 'Anweisung zur Erlernung des Schachspiels,' &c. Essen, 1827. 8vo.

2. 'Belehrende Unterhaltung für junge angehende Schachspieler,' &c. Essen, 1831 and 1832. 16mo.

Lewis (Wm.) 1. 'Oriental Chess, or Specimens of Hindostanee excellence in that celebrated game.' 2 vols. Lond., 1817.

2. 'Stamma on Chess,' with notes. 8vo. Lond., 1818.

3. 'Greco on Chess,' with notes. 8vo. Lond., 1819.

4. 'Sarratt on Chess,' with notes. 8vo. Lond., 1822.

5. 'Elements of the game of Chess.' 12mo. Lond. 1822.

6. 'Chess Problems.' 12mo. Lond., 1827.

7. 'The Games of the Match at Chess played by the London and the Edinburgh Chess Clubs, with numerous variations and remarks.' 8vo. Lond., 1828.

8. 'Remarks on the Report of the Committee of the Edinburgh Chess Club.' 8vo. Lond., 1829.

9. 'A Series of Progressive Lessons on the game of Chess.' 8vo. London, vol. i., 1831, vol. ii., 1832.

10. 'A Selection of Games at Chess, played at the Westminster Chess Club, between Monsieur L. C. de la Bourdonnais and an English amateur of first-rate skill, with remarks.' 8vo. London, 1835.

11. 'Chess for beginners.' London, 1835.

Mr. Lewis has likewise published a very valuable translation of Carrera.

'The Games of the Match at Chess, &c., as reported by the Committee of the Edinburgh Chess Club.' Edinburgh and London, 1829. 8vo.

Walker (George). 1. 'Variations on the Muzio Gambit.' London, 1831. 12mo.

2. 'A New Treatise on Chess.' London, 1832; second edition, 1833, small 8vo.

3. 'A New Translation of Philidor's Analysis.' London, 1832, royal 18mo.

4. 'A Selection of Games at Chess, actually played by Philidor and his contemporaries, now first published from the original MSS., with notes,' &c. London, 1835, small 8vo.

5. 'Chess made Easy.' London, 1836.

Walker (W. Greenwood.) 'A selection of games at Chess actually played in London, by the late Alexander Mc Donnell, Esq.,' &c. London, 1836. 12mo.

CHESTER, an antient and celebrated city of England, on the River Dee, near to where it falls into an æstuary of the Irish Channel.

In nothing is the impression of the Roman possession of this island more observable than in the names of so many considerable places, into which this word *Chester*, which is the Latin *Castrum* or *Castra*, enters; Manchester, Ribchester, Grantchester, &c. Sometimes it appears in the form of *Caster*, as Doncaster, Tadcaster. It is sometimes much contracted, as in Manceter, Exeter, Wroxeter. It occurs here without any prefix, but antiently this city was often called West Chester. There are other Chesters and Castors.

It might be inferred from the name alone that these were originally military stations. But Chester does not depend on etymology alone for proof of its Roman origin, or of its having been the station of a part of the Roman army. The distribution of the streets, the two main thoroughfares cutting one another at right angles in the centre of the city, is Roman. There is reason to conclude that the fortifications of the city are on a Roman basis. Some remains of Roman masonry have been discovered; and Chester has produced innumerable coins, fibulæ, inscribed tiles, inscribed stones and altars, the usual vestiges of the Romans. The most important discovery of this kind was made in 1653, when a votive altar to Jupiter Tanarus was dug up, which had been raised by an officer of the twentieth Legion called the Victorious. Other traces of this particular Legion have been found at Chester, confirming what we find in Antonine's Itinerary, that at *Deva* (which is evidently the Dee, meaning the station on the Dee, as Doncaster is in the same Itinerary mentioned as Danum, the Don, the river on which it is situated) the twentieth Legion had its station. The Welsh name of Chester has reference to the same fact, being, when rendered into English, the City of the Legion on the waters of the Dee.

Chester had, in the middle ages, several historical writers of its own, as Roger called De Cestria, Ralph Higden, and Henry Bradshaw. We pass over their traditionary stories of the antiquity and origin of their city as undeserving regard, and consider what has now been related as the sufficient and the true account of the origin of this city. We might, if our limits would allow, pursue the inquiry further, and ask *why* the Romans fixed upon this point as the permanent station of one of their legions, and at what period of their possession of Britain this was done. The Messrs. Lysons conceive that the original castrum was constructed by Ostorius Scapula soon after the defeat of Caractacus.

Chester was evidently the most considerable place in a large tract of country in the Roman times, and so continued when the Romans had withdrawn their forces. The possession of it was an object of importance to the Saxons and to the remains of the Britons. The two nations seem to have possessed it by turns, and it was certainly one of the last, if not the last, of the places which yielded to the Saxon power. In the Saxon Chronicle we are told that Ethelfrid, king of Northumbria, took it from the Britons in A.D. 607. After that date it was in the hands of the Britons, who held councils in it for political purposes. Finally, in A.D. 830, it fell under the power of Egbert.

From that period to the Conquest, 1066, Chester is often mentioned in the annals of the Saxon sovereignty, and its

own annalists have delighted to record that King Edward was one day rowed by six kings (no doubt small Welsh princes) on the waters of the Dee. Its situation as a frontier fortress against Wales necessarily gave it importance; but it had also a consequence as a place of security for the inhabitants of the coast when they were menaced with invasion from the Danes and Northmen.

The circumstance which we have just mentioned was the cause of one of the most important events in the history of Chester. On one occasion, when a descent from the Danes was apprehended, the body of Saint Werburgh, a Saxon saint, daughter of Wulphere king of Mercia, which had been preserved as a sacred relic, was removed for security to Chester. This was in A.D. 875. These relics remained at Chester. No doubt some kind of Christian community existed at Chester before this circumstance occurred: but from this time Saint Werburgh became the tutelar saint of Chester; a religious community was founded, among whom she was held in especial honour, and in whose church her relics were sumptuously enshrined. The house continued to flourish through a period of six centuries and a half, one of the wealthiest of the monastic establishments of England, its annual revenues exceeding 1000*l*., when at the Reformation it was dissolved with the other foundations of its class.

Chester had also in the Saxon times a peculiar local government, and peculiar municipal customs, of which there is a large and particular account in 'Domesday Book.' The number of the rated houses was 431. It had its trade by sea and its home trade; and there is reason to believe that associations of the members of particular trades, which have flourished longer at Chester than in most other places, had their origin in Saxon times, and that even some of the public processions and the sports with which the inhabitants of Chester have been from time immemorial entertained, may be continuations of Saxon usages. Chester had also in Saxon times a large *shire* attached to it, which in form has been aptly compared to an eagle's wing, the tip of it touching on Yorkshire. This was called Chester-shire (Cestrescyre), contracted into Cheshire. The bishop of Lichfield was also in remote times not unfrequently called bishop of Chester.

At the Conquest this shire was given by one sweeping grant (with the exception only of what belonged to the bishop) to Hugh of Avranche, commonly called Hugh Lupus, or Hugh Wolf, who had for his favourite device the Wolf's Head. Hugh was a near relation of the Conqueror, and possessed this portion of the conquered country with the Saxon title of Earl, but with some privileges which did not always accompany such concessions. Cheshire became what is called a County Palatine, having courts peculiar to itself and the custody of its own records. Hugh resided in the castle at Chester, and there he held his courts and parliaments, in which sat the superiors of the religious houses of the county, together with the eight great subinfeudatories, among whom he distributed the greater portion of his territory. The succeeding earls of his family, of whom there were six, maintained the same state. The series terminated in the reign of Henry III., and from that time the Earldom of Chester has been in the crown or in the hands of members of the royal house. Most of the large tenures created by the Conqueror reverted sooner or later to the crown by forfeiture or marriage.

The period from the Conquest to the reformation of religion, forms another great æra in the history of English cities. In that period Chester was often visited by the king, and was occasionally the scene of interesting public events. It has had a series of charters, by which valuable privileges were granted or confirmed, from the beginning to the close of that period, viz., from Hugh Lupus and some other of the succeeding earls of Chester, and when they were extinct, from the Kings Edward the First and Third, Richard the Second, and Henry the Seventh. As early as 1242 there is found a person with the title of mayor, who presided over a guild merchant [illegible]torial. Chester was in those times a place of co[illegible] trade. Beside the great monastery of Saint Werburgh, there was a religious community of women [illegible] walls: the black, the white, and the gr[illegible] establishment in Chester; a college of the Holy Cross is mentioned, and hospitals of Saint Anne and of Saint John the Baptist, of which the latter escaped suppression at the Reformation, and continues to this day; besides numerous parish churches, all of which were founded before the close of the period of which we are speaking.

Chester had, during this period, among its inhabitants, some whose names are connected with the early literature of England; we have already mentioned three such persons, and it may be added, that Higden, the most celebrated of the three, whose æra was the reign of Edward III., is supposed to be the author of a set of mysteries, or religious dramas, which were exhibited by the several trades in Chester from time to time, and of which copies have descended to the present day.

Towards the close of the reign of King Henry VIII., two great changes took place at Chester. First, in the 34th of that reign, writs were first issued to it to send members to parliament; and second, it became the seat of one of the newly appointed bishops. The house of Saint Werburgh being dissolved, its church became the cathedral of the new see. A dean and six prebendaries were placed in it, Thomas Clark, the last abbot of Saint Werburgh, in Chester, being made the first dean. The revenue of the dissolved monastery furnished a provision for the prebendaries, dean, and bishop. The diocese assigned to him was the whole county of Chester, which had previously been under the superintendence of the bishop of Lichfield, and the county of Lancaster, with the archdeaconry of Richmond, part of the antient diocese of York. At the same period, 1544, a grammar school was founded, and Chester was appointed, about the same time, one of the sanctuary places.

From the period of the Reformation to the present time there are no very striking events in the history of Chester, nothing which in any eminent degree affected the condition or character of the place. It occasionally received royal visitants, and in the civil wars it had to endure a protracted siege. King Charles I. was for a time in the city, and from one of the towers, on the walls, is said to have personally witnessed the defeat of his army on Rowton Heath. The three earliest charters in the possession of the corporation were granted by Ranulph or Randle, earl of Chester, early in the thirteenth century. Charters were granted or renewed by several monarchs, and its corporation and parliamentary annals exhibit the usual amount of party struggles and disputed rights; so that the Reform Act, and the Municipal Corporation Reform Act, may be regarded as what more than any thing else in its more recent history will influence the future character and condition of the place. Previously to the passing of the Reform Act, the election of members of parliament was in the freemen, who were usually about 1200. The city was divided into twelve wards and nine parishes.

The modern history of the trade of Chester is rather the history of its decay, to which the prosperity of the port of Liverpool has in some degree contributed; but this decline is partly owing to the bad navigation of the Dee. A few gloves are manufactured here, and Chester has long had a reputation for the making of tobacco-pipes. Its fairs, of which there were two of very early date, and one by a charter of King Charles II., were long amongst the most celebrated of that species of mart, as long as the inland consumption was chiefly supplied in that way. King William established a mint at Chester, which had however no long continuance. A canal, which was cut in 1772, had no success till after many years the company united themselves to the proprietors of the Ellesmere canal. When the Act of Toleration gave liberty to the non-conforming Protestants to meet publicly for worship, they erected a spacious meeting-house in Chester, one of the earliest ministers in which was Matthew Henry, whose writings were long in great esteem in the non-conformist body. The modern Independents, the Baptists, and the Quakers, have each meeting-places in Chester; there are also a Roman Catholic and five Methodist chapels. The grammar-school of Chester, called the King's School, which is attached to the cathedral, is under the direction of the dean and chapter; there is also the marquis of Westminster's school, for 400 or 450 boys and girls, who are educated at the expense of the marquis; a diocesan school, and three infant schools. Chester has had many public benefactors, so that its charities are numerous. In 1700 a blue-coat school was founded, and in 1750 another for girls. The General Infirmary was opened in 1761. In 1763 an act of parliament was passed for the regulation of a house of industry; there is also a school of industry; and sunday-schools were established when first the idea was suggested.

Chester has always been the residence of many families

of gentry. It has its theatre, its assembly, and its races. Several persons of literary eminence have resided here in recent times, as Dr. Haygarth and Mr. Falconer. In the seventeenth century Chester was the residence of a remarkable family named Holme. A taste for accumulating local and historical information appeared in four successive generations of this family, the individuals all bearing the name of Randal. The last Randal Holme being poor sold the whole collection to the earl of Oxford, who was then forming his great library. These manuscripts came with the rest of the Harleian collection to the British Museum, where they form 267 volumes, numbered in the catalogue 1920—2187; they abound in minute information, especially respecting Chester and the whole county.

The population of Chester, in 1774, was 14,713 persons; in the last census, 1831, it was 21,344. The number of houses inhabited was 4096; uninhabited, 388; building, 43. The number of families, 4628; of which 355 were chiefly employed in agriculture; 2665 in trade, manufactures, and handicraft; and 1608 not comprised in either of those classes: the number of marriages in 1830 was 396.

Chester is one of the very few places in England which have maintained in a tolerable state of completeness the walls which were erected for their defence in remote ages; at no place are they so entire as at Chester. But now, instead of contributing to the defence of the inhabitants, they afford only an agreeable promenade, with pleasant views, at various points, of the surrounding country; they are nearly two miles in circuit. The walls and the rows are two most striking objects in Chester to a stranger. The rows are a species of wide foot-path, raised above the level of the street, at the height of the first story of a house, and covered over head by the third story of the house; it is as if the room in a series of houses was thrown open, or rather taken away, which would otherwise be what is usually called the front room of the first floor. The two great intersecting streets are, for the most part, constructed on this plan: Pennant supposes that this mode of construction may have existed from the Roman times. The corporate officers of Chester, previously to the late Act, were a mayor, recorder, two sheriffs, twenty-four aldermen, and forty common-councilmen.

(King's *Vale Royal*; Lysons's *Magna Britannia*; *the Chester Guide*; *the Stranger in Chester, &c.*; *Municipal Corporations' Reports*.)

CHESTER-LE-STREET. [DURHAM.]

CHESTERFIELD, a parish, municipal borough, and market-town in the hundred of Scarsdale, Derbyshire, 132 miles N. by W. from London. The parish of Chesterfield, which contains several chapelries, hamlets, and townships, has an area of 13,160 acres, with, in 1831, a population of 10,688, which is an increase of 1498 on the census of 1821. This is attributed, principally, to an increase of collieries and iron works. The population of the borough of Chesterfield in 1801, was 4267; in 1811, 4476; in 1821, 5077; in 1831, 5775. Two rivulets, the Hyper and Rother, run past the town.

Chesterfield is conjectured, from its name, to have been a Roman station. At the Norman survey it was an insignificant place. The town received various privileges from King John, but was not incorporated till the reign of Elizabeth. Under the Municipal Corporations' Act, it is governed by four aldermen and twelve councillors, but is not divided into wards. The limits of the borough are co-extensive with the township, which is about four miles in circumference. The town is lighted under an act passed in 1825. In and near the town there are silk, lace, and pipe manufactories, potteries, and iron founderies.

Chesterfield Church, erected during the thirteenth century, is a beautiful and spacious edifice. The spire is remarkable from being crooked. This crookedness, which was supposed to be merely apparent, has been ascertained to be real, by actual measurement. The bulging out of a portion of the middle of the spire causes the ball on the summit to deviate from the perpendicular six feet towards the south, and four feet four inches towards the west. The spire is 230 feet high. Its crookedness may be the result of some accident (perhaps the effect of lightning) which is not recorded.

There were in 1835 twenty-six daily and Sunday schools in the town of Chesterfield. A grammar or free-school, founded in the reign of Elizabeth, and formerly well attended, has been closed since 1832. It was under the management of the corporation. There are various public and benevolent institutions, and a literary and philosophical society in the town.

The Chesterfield Canal, which commences in the tideway of the Trent, after a course of forty-six miles, terminates at Chesterfield. This canal was planned by Brindley. It has sixty-five locks, and is carried through two tunnels, one of which is 2850 yards long. The North Midland Railway, between Derby and Leeds, will be carried past Chesterfield. (Woodhead's *Account of the Borough of Chesterfield for* 1835.)

CHESTERFIELD, PHILIP DORMER STANHOPE, fourth earl of, was born in London on the 22nd of September, 1694. He was educated by a private tutor, and at the age of 18 sent to Trinity College, Cambridge, where he studied the Greek and Roman writers with unusual diligence. He tells us that he narrowly escaped becoming a pedant, a character for which he had the greatest contempt in after life; and that he drank and smoked at college notwithstanding his aversion to wine and tobacco, because he thought such practices were *genteel*, and made him look like a man. In 1714 he left the University to make the usual grand tour of Europe. He passed the summer at the Hague, where his fashionable associates not only laughed him out of his pedantry, but initiated him into a love of play which never forsook him. Many years after he tells his son in one of his letters that at the Hague he thought gambling an accomplishment, and as he aimed at fashionable perfection he adopted cards and dice as a necessary step towards it. From the gamblers of the Hague he went to the fashionable ladies and titled courtezans of Paris, who, as he was accustomed to boast, completed his education and gave him his 'final polish.' He was at Venice, when the accession of George I. in 1715, induced him to return home with great speed, in order to be in time for a court place. Through the interest of his family connexions, he was made a gentleman of the bed-chamber to the Prince of Wales, afterwards George II. In the first parliament of the new reign he was returned for St. Germains in Cornwall, and as he was determined to attract attention, from the moment of his election he studied nothing and thought of nothing, for a whole month, but his maiden speech. Though he afterwards became an accomplished orator, his first effort was rather a failure, and betrayed a violence of manner not at all consistent with his smooth silken code. The speech was otherwise unfortunate, for it attracted attention to the fact that he was not quite of age, and consequently liable not only to expulsion from the Commons' house, but also to a fine of 500*l*. An opponent mentioned this to him privately as a good mode of silencing his zeal: Chesterfield took the hint, and withdrew for some months to Paris, where, as it was always suspected, he was engaged in some secret court-intrigue. He returned in 1716, and resuming his seat, spoke in favour of the Septennial Act. In the inveterate quarrel which broke out between George I. and his heir, he adhered to the Prince of Wales, nor could his uncle, General (afterwards Earl of) Stanhope, who was then at the height of favour, with plenty of places at his disposal, ever induce him to change sides. Being much with the heir apparent, he undertook the difficult task of transforming a German prince into a British king, and of making a fashionable and a most refined man (as he understood it) of the rough and homely George.

His first division in parliament against the ministry was on a motion for the repeal of the Schism Bills, where he decidedly took the illiberal side of the question, 'supposing,' as he lived to confess with shame, 'that it was impossible for the honestest man in the world to be saved out of the pale of the church; not considering that matters of belief do not depend upon the will; that it is as natural and as allowable that another man should differ in opinion from me, as that I should differ from him; and that if we are both sincere, we are both blameless, and should consequently have mutual indulgence for each other.'

In 1726 he was removed by the death of his father to the House of Lords, where, according to his biographer, Dr. Maty, his manner of speaking was much more admired than it had been in the Commons. He was constitutionally weak, and devoid of strong passions, and as a speaker had little faculty of touching the higher feelings of others, but he was brilliant, witty, and perspicuous,—a great master of irony, and was allowed by all his contemporaries to be a very effective debater. On the accession of George II., whom, as prince, he had steadily served for thirteen years,

Chesterfield expected a rich harvest of honours and places; but having mistaken the relative amount of the influence exercised on his master's mind by the queen and the mistress, he paid his court to Mrs. Howard (afterwards Lady Suffolk), and neglected Queen Caroline, who eventually proving to be more powerful than the mistress, checked his aspiring hopes. He was not alone in this error:—Lord Bolingbroke, Lord Bathurst, Swift, Pope, and many others of less fame, shared in it, and in the consequent disappointment. Pope's villa at Twickenham was the place of rendezvous, where the royal mistress used to receive the incense of Chesterfield and the rest who had hoped to rise through her favour. In 1728, the year after the accession, Lord Chesterfield accepted the embassy to Holland, where he gained the friendship of Simon Van Slingeland, a distinguished statesman and then Grand Pensionary, and assiduously cultivated his talent for diplomacy. To Slingeland he afterwards acknowledged the greatest obligation, calling him his 'friend, master, and guide,' and adding, 'for I was then quite new in business, and he instructed me, he loved me, he trusted me.' Chesterfield had the merit of averting a war from Hanover, for which service George II. made him High Steward of the Household and Knight of the Garter. Under the plea of ill health he obtained his recall from Holland in 1732, and returning to court, where his office of Steward gave him constant access, he again indulged the hope of rising. A curious anecdote is told by Horace Walpole, to account for the renewed displeasure and animosity of the queen, and for Chesterfield's sudden secession from the court party. (Walpole's *Reminiscences*.) No sooner had his Lordship shown his decided opposition to Sir Robert Walpole, than he was deprived of the High-Stewardship, and so badly received at court, that he soon ceased visiting there altogether. At the end of Sir Robert's ministry in 1742 Chesterfield went into opposition against the members of the new cabinet, with whom, when out of place, he had been accustomed to vote in the minority. On the coalition of parties known by the name of the 'broad-bottomed treaty,' he took office and was admitted into the cabinet, sorely against the inclination of the king, who considered him as a personal enemy. Chesterfield, while in opposition, had still further offended the king by repeatedly denouncing the union of the electorate of Hanover with the kingdom of England, and by proposing that they should be separated from each other, and allotted to different branches of the reigning family. At the beginning of 1745, the year of the Pretender's last war in Scotland, and a time of intrigue and difficulties, he was again dispatched as ambassador to Holland. In the course of the same year he was named while in Holland, Lord Lieutenant of Ireland, and immediately repaired to his post, where he distinguished himself, in a season of very great turbulence, by his tolerant spirit, and conciliating popular manners. His short government in Ireland was perhaps the most valuable part of his public life. George II., whose prejudices were removed or weakened, recalled him from Dublin in April, 1746, and appointed him Principal Secretary of State. In consequence of being obstructed in some measures which he considered important, and of his now really declining health, he resigned his office in January, 1748, much, it is said, to the regret of the king. He was kept from the House of Lords by his giddiness and deafness, but in 1751 he delivered an elegant speech in favour of adopting the New Style. His declining years, though now and then brightened by flashes of wit and merriment, were clouded by sickness and despondency. He died on the 24th of March, 1773, in the 79th year of his age. His natural son, to whom his well-known Letters were addressed, died five years before him.

By his wife, Melusina Schulemberg, Countess of Walsingham, and niece to George the First's mistress, the Duchess of Kendal, he had no issue. After much opposition from George II., who pretended to found his objection on Chesterfield's incessant gambling, this German lady married his Lordship in 1733. Chesterfield always had a certain taste for literature and a partiality for the society of literary men; at different times of his life he associated with Addison, Pope, Swift, Gay, Arbuthnot, Voltaire, Montesquieu, and Algarotti. He patronized Hammond, a poet of third-rate merit, but an unfortunate amiable man, and procured him a seat in parliament. In his intercourse with Samuel Johnson he gave himself lordly airs, and the sturdy doctor, thinking himself slighted, avenged himself in the celebrated letter which was prefixed to the first edition of his Dictionary. His Letters to his Son, which appeared the year after his death, were never intended for publication. They have been much censured for the loose morality which they are supposed to inculcate; but still it must be admitted that they show a great knowledge of the world, and much practical good sense, expressed in an easy, agreeable, and correct style. His Miscellanies, consisting of papers printed in 'Fog's Journal,' and 'Common Sense,' of some of his speeches and other state papers, and a selection from his Letters to his Friends, in French and English, together with a Biographical Memoir, written by his friend and admirer, Doctor Maty, were published in 2 vols., 4to., in 1777. A third volume, of doubtful authenticity, was added in 1778. Chesterfield also wrote Nos. 100 and 101 in the 'World,' in praise of Johnson's Dictionary, and sundry copies of very light verses which appeared in Dodsley's collection. (Dr. Maty's *Life*; Lord Orford's *Works*, vol. i., p. 533, and vol. iv., p. 277.)

CHESTNUT. [ÆSCULUS; CASTANEA.]

CHEVAL DE FRIZE, a square or octagonal beam o. wood, from six to nine feet in length, and pierced by iron rods or wooden pickets six feet long, which are pointed at each end and shod with iron; the pickets are placed six inches asunder, and pass through two opposite faces of the beam in directions alternately at right angles to each other, the cheval resting on the ground at the lower extremities of the pickets. A series of these, disposed in lines and connected together by chains, is placed in the ditch, on the berme, at the entrances or behind the glacis of a field fort; or on the breach made in the rampart of a fortress, in order to impede the enemy at the time of making an attack.

Chevaux de frize, on account of their portability and the facility with which they can be put together or taken to pieces, were much esteemed formerly, and were employed in the open field as a protection against charges of cavalry; but they are now seldom used for this purpose, being easily deranged by the enemy's artillery.

When Badajos was besieged in 1812, chevaux de frize, formed by fixing sword blades in beams of wood, were planted by the defenders on the breaches in the Trinidad bastion and in the adjoining curtain, where they proved a fatal obstacle to the troops engaged in the memorable assault on that fortress.

CHEVIOT HILLS, THE, constitute the most eastern portion of the extensive mountain-range which begins on the west at Loch Ryan and traverses the whole breadth of South Scotland till it terminates on the boundary line between England and Scotland. Peel Fell, 55° 17′ N. lat., and 2° 35′ W. long., may be considered as the most western part of the Cheviot Hills. From this point the ridge runs N.E. for about 20 miles, and terminates in Cheviot Hill, the highest of its summits, which is 2658 feet above the sea. An elevated mountain tract, however, continues nearly due N. from this, separating the Breamish, which rises on the eastern declivities of the Cheviot Hill, from the Beaumont, which originates on its western side: this tract terminates at no great distance from the junction of these two rivers, which form the Till. To the E. of Cheviot Hill, but separated from the range by a valley, is Hedgehope 2325 feet above the sea. The highest parts of this range are covered with peat, and the lower acclivities with alluvial earth. The whole mountain-tract, especially towards the S., presents to the eye a great number of green hills, differing in form, and inclosing numerous deep, narrow, and sequestered valleys. The formation of the rocks is primitive, consisting of porphyry, especially east of Carter Fell. On Carter Fell, which is at a short distance from Peel Fell, limestone is quarried.

CHEVY CHACE, the name of an old English ballad, founded upon the history of a hunting encounter which took place in 1388 at Atterburn, upon the south of the Cheviot hills, between the martial families of Percy and Douglas. The older version of this ballad was first printed by Hearne, from a manuscript in the Ashmolean Museum at Oxford, and afterwards by Bishop Percy in the 'Reliques of ancient English Poetry.' It begins

'The Perse owt of Northomberlande.'

According to a communication made by the late Rev. J. J. Conybeare to the editors of the 'British Bibliographer,' there is now little doubt but that the author of this ballad was one Richard Sheale, who dwelt at Tamworth, whom Percy and Ritson both agreed to consider as the transcriber only of the Ashmolean copy. The style of this ballad is rugged and

uncouth, and it is written in the very coarsest and broadest northern dialect. There seems the best reason for believing that its composition may be dated about or soon after 1540.

The more modern ballad of Chevy Chace, that of which Addison has criticised the beauties in the 'Spectator' (Nos. 70, 74), begins

'God prosper long our noble king.'

Bishop Percy ascribes this version to the time of Queen Elizabeth, and it was probably late in her reign when it was written, or Sir Philip Sydney would have had no occasion to lament that the ballad of Chevy Chace, in his time, was so 'evil-apparelled in the rugged garb of antiquity.'

Bishop Percy has printed both ballads in his 'Reliques,' edit. 1794, vol. i.: the old one at p. 1, the latter ballad, p. 270.

CHEYNE, GEORGE, was born in Scotland, in the year 1670. He was at first intended for the church, but after attending the lectures of Dr. Archibald Pitcairn, he determined to practise medicine. Having taken his doctor's degree, he came to London about 1700, and soon after published his 'Theory of Fevers,' in which he attempts to explain the doctrine of secretion on mechanical principles. His next work, 'On Fluxions,' was published in 1705, and procured his admission into the Royal Society. At a maturer age he called this a juvenile production, and acknowledged that it was justly censured by De Moivre, to whom and to Dr. Oliphant he makes an apology in the preface to his 'Essay on Health and Long Life,' for having treated their criticisms with rudeness. His 'Philosophical Principles of Natural Religion,' containing the elements of natural philosophy, and the evidence of natural religion to be deduced from them, was dedicated to the Earl of Roxburgh, for whose use it appears to have been written. An advertisement of the third edition makes mention of a second part, 'containing the nature of infinites, together with the philosophic principles of revealed religion;' but we do not know if this part was then first added.

Cheyne's natural disposition to corpulency was so increased by full living in London, that in a few years he became 'fat, short-breathed, lethargic, and listless.' His health gradually sank, and, after trying a variety of treatment with little benefit, he confined himself to milk, with 'seeds, bread, mealy roots, and fruit.' The experiment succeeded, and he was soon relieved of his most distressing symptoms. During his illness, being deserted by his 'bouncing, protesting, and undertaking' companions, who could not bear to see him in such misery and distress, he began to look to religion for consolation, and at last 'came to this firm and settled resolution in the main, viz., to neglect nothing to secure my eternal peace, more than if I had been certified I should die within the day; nor to mind any thing that my secular obligations and duties demanded of me, less than if I had been ensured to live fifty years more. This, though with infinite weakness and imperfection, has been much my settled intention in the main since.' (*The English Malady*, 2nd edit., p. 334.)

In 1722 he published an 'Essay on the true Nature and due Method of treating the Gout,' together with the virtues of the Bath waters, and the nature and cure of most chronic diseases. He had resided at Bath during the summers of several years, and attributed much of the benefit he had received to drinking the waters. In 1724 appeared his well-known 'Essay on Health and long Life,' in which he inculcates the necessity of a strict regimen, particularly in diet, both in preventing and curing diseases. It was dedicated to Sir Joseph Jekyll, Master of the Rolls, who had been under the author's care. In the preface he gives an account of his former works, which he censures where faulty, with great frankness, particularly when he had treated other writers with levity or disrespect. In 1733 he brought out his 'English Malady,' a treatise on the spleen and vapours, as well as hysteric and hypochondriacal diseases in general. This work, once very popular, contains a very minute account of the author's own case. It appears that on his recovery he gradually returned to a more generous diet. 'However, for near twenty years I continued sober, moderate, and plain in my diet, and in my greatest health drank not above a quart, or three pints at most, of wine any day (which I then absurdly thought necessary in my bulk and stowage, though certainly by far an over-dose), and that at dinner only, one half with my meat, with water, the other after, but none more that day, never tasting any supper, and at breakfast nothing but green tea, without any eatable; but by these means every dinner necessarily became a surfeit and a debauch; and in ten or twelve years I swelled to such an enormous size, that upon my last weighing I exceeded 32 stone. My breath became so short, that upon stepping into my chariot quickly, and with some effort, I was ready to faint away for want of breath, and my face turned black.' (*The English Malady*, 2nd edit., Lond., 1734, p. 342.)

He now returned to his low diet, and with the same success as before, though it required a longer time to re-establish his health. The proposal of a milk diet appears to have afforded much diversion to contemporary wits, some of whose gibes and sarcasms rather ruffled our author's complacency; but if it were worth while to refute epigrams, it would be easy to show that he was by no means a Pythagorean zealot: thus the very title of a chapter in his 'English Malady' is 'Of nervous cases, requiring a mixed or trimming regimen of diet, viz. of tender young animal food, and a little wine and water one day, and the other only milk, seeds, and vegetables.' Dr. Cheyne died at Bath, in 1742, at the age of 72.

CHIA'NA, VAL DI, a valley in Tuscany, in the province of Arezzo, running N. and S. 30 miles in length, from Arezzo to Chiusi, and between two chains of hills, of which the western divides it from the valley of the Ombrone, and the E. from the Thrasymene lake and the valley of the Tiber. The Chiana was once hardly anything but a vast marsh, and its air was pestilential, until the draining began under the Grand Duke Leopold I., which was finished under his son Ferdinand. By this operation above 36 square miles of ground are become now one of the most fertile districts of Tuscany. (Manetti, *Carte idrauliche sullo stato antico e moderno della Val di Chiana;* Fossombroni; Corsine, &c.) The waters of the N. and larger part of the Chiana now run N. into the Arno. In antient times they all flowed S. into the Tiber. [ARNO.]

CHIAROSCU'RO is a branch of painting, the object of which is to combine and arrange the light and dark parts of a picture to the best advantage. The term is derived from two Italian words, *chiaro*, light, and *oscuro*, dark, and includes the treatment of bright and dark colours or tints, as well as simple light and shade. It is by chiaroscuro that relief and depth, and what is termed the *effect* of a picture, are produced; by a judicious contrast of bright colours with dark, or a combination of the two, or by their gradual blending; by involving one part of the picture in shadow, while another part stands forth in full light; or by making the light gradually die away into the shadows. Leonardo da Vinci was the first who reduced the art of chiaroscuro to any thing like a system. It was afterwards practically improved by Correggio and by Titian, under whom it may be said to have attained perfection. It gives to Rubens all his richness and brilliancy, to Rembrandt his magical luminousness. It must however always remain, from its nature, difficult to teach or subject to rules. To acquire excellence in the use of chiaroscuro, the student should study the properties of light, and the mode in which it is diffused, collected, reflected, and separated into colours. He should refer to the works of the best masters, and observe the means which they have employed to imitate nature; and, above all, he should constantly watch and note down the effects of light and shade as exhibited in the objects around him under various modifications. The most powerful effects in painting will always be the nearest to nature; and the most pleasing will be those which are best selected out of the infinite variety which she presents for our choice.

CHIA'VARI, a province and town of the Sardinian States, in that part of the old Genoese territories called Riviera di Levante or E. coast. The province of Chiavari is bounded W. by that of Genoa, S. by the Mediterranean, N. by the province of Bobbio, E. and S.E. by that of La Spezia, and N.E. by the State of Parma. It is about 20 miles in length N.W. and S.E., and about 15 miles in its greatest breadth. The Apennines occupy the greater part of it; their summits divide it from the valley of the Trebbia, in the province of Bobbio, and from that of the Taro, in the State of Parma, the waters of which flow N. into the Po. The only rivers of the province are the mountain torrent of Rapallo, which runs into the Mediterranean, and the Vara, also a mountain stream, which flows E. into the Magra, which comes down from Pontremoli. The strip of land along the coast has a mild climate, in which the vine, olive,

orange, and lemon thrive. The mountains abound with chestnut-trees. The inhabitants are chiefly employed on the sea.

Chiavari, a bustling place, with 9800 inhabitants, and a small harbour, is the residence of the intendente and of the courts of justice and commercial court: it has a college kept by the brothers Scholarum Piarum, besides the public elementary schools. Sestri di Levante has 7000 inhabitants; Rapallo is a pleasant town on the gulf of that name, with fine gardens and country-houses in the neighbourhood, and 9000 inhabitants; Santa Margherita, 6000; Lavagna, 5000; Varese, 5600; Borzonasca, 4700; and S. Stefano d'Aveto, 5700; the two last are inland among the Apennines. (*Calendario Sardo*, 1824.) The population of the whole province of Chiavari is about 91,000. (Serristori, *Saggio Statistico*.)

CHIAVENNA. [VALTELINA.]

CHICACOLE. [CIRCARS, NORTHERN.]

CHICHESTER, an antient walled city, the chief seat of a bishopric, to which it gives name, a parliamentary and municipal borough, and market-town, in the Rape of Chichester, western division of Sussex, 56 miles S.W. by S. from London, and about 6 miles from the sea-coast. It stands at the termination of a gentle descent from the South Down hills, on a slight rising ground sloping in all directions, in a low country, which is part of the plain that extends from the west side of Brighton to Portsmouth harbour, between the South Downs and the sea, and attains at Chichester its greatest width. The city within the walls, which are well preserved, is divided by two principal streets running north and south, and east and west, which intersect each other near the centre of the town; in this respect resembling Chester, and preserving the form of a Roman encampment. Beyond the walls the suburbs are prolonged in the direction of the principal streets. A small rivulet called the Lavant, which is generally dry in summer, bounds the city on the east and south sides. The city and suburbs stand in eight parishes, besides an ecclesiastical precinct termed the Close, round the cathedral, and two extra-parochial pieces of land. The population of these in 1801 was 4744; in 1811, 6425; in 1821, 7362; in 1831, 8270. The number of inhabited houses in 1831 was 1514. These returns give 5·78 persons to a house in 1801, and 5·46 in 1831. There is no manufactory at present in Chichester. The cattle market, which is held every alternate Wednesday, is one of the largest in England held within the precincts of any town, and is always well supplied with cattle, horses, sheep, and pigs. There are several fairs in the town and the immediate vicinity at different stated times, but none are of great importance. Large quantities of corn are exported through the town for London and the west of England.

Chichester was undoubtedly a Roman station, probably Regnum. It is conjectured that Vespasian resided here, when in Britain, and that Claudius erected a temple in it, dedicated to Neptune and Minerva, of which an inscribed stone, dug up in 1731, is supposed to be a commemoration. The walls, which are nearly a mile and a half in circuit, were in all probability erected originally by the Romans. At the end of the principal streets there were formerly fortified gates, of which the eastern, the last standing (taken down in 1783), is said to have afforded decided proofs of Roman architecture. The present walls are supposed to have been re-constructed with the materials of the Roman walls, and a mound of earth (now planted in different parts with fine elm trees), which runs round the inside of the walls, is stated to be in the style in which the Romans constructed such works. But it is doubtful if there be any Roman remains now existing in the walls or buildings of the city.

The word Chichester is said to be a contraction of *Cissanceaster*, the city or castle of Cissa, an Anglo-Saxon chief, who, if credit can be given to the chronicles, repaired and partly rebuilt it, after it had been destroyed in a siege. At the Norman survey Chichester had only two hundred and thirty-eight houses, which were given to Roger de Montgomery, who was created the first earl of Chichester. This nobleman is believed to have been instrumental in procuring the removal of the seat of the bishopric of Sussex, or Selsea, from the peninsula of Selsea, where there was formerly a considerable town, to Chichester, which was one cause of the early prosperity of the place. The earliest charter extant is one by Stephen, confirming previously existing privileges and customs; which were further confirmed and extended by numerous charters from different kings. It is included in the list of towns of the Staple in the 27th Edward III., called Ordinatio Stapularum. Under the Municipal Corporations' Bill the city is divided into two wards, with six aldermen and eighteen councillors. It returned two members to Parliament from an early date. By the Reform Act the boundary of the parliamentary borough was enlarged considerably round the city.

A cathedral, built mostly of wood, was founded here in 1108. The present cathedral, which was erected during the 13th century, exhibits some specimens of Norman design, and also some examples of the first pointed style, when the Petworth or Sussex marble came into fashion. As a cathedral-church it is of an inferior class, but the spire, which is about a century later in date than the body of the building, is finely proportioned. The cathedral is built in the usual form of a cross; its extreme length from east to west is 407 feet; from north to south, 150 feet; the transept is 129 feet long, and 34 feet wide; the nave and aisles 97 feet wide; and the tower and spire 300 feet high. The north transept is now used as a parish-church. In the interior there are nine monuments by Flaxman, one of them to the memory of William Collins, the poet, who was a native of Chichester. It also contains several antient monuments, which are curious, and some of more recent date that are not unworthy of notice. The best of the latter is in the form of a statue to the memory of Mr. Huskisson, who was for some time member for this city. It is the work of Carew, and was raised by subscription. At a short distance from the north-west angle of the cathedral is an insulated bell-tower, traditionally known as Ryman's tower, which is noted for its massive walls. The palace of the bishop of Chichester, whose diocese comprehends nearly the entire county of Sussex, is within the city. There is a neat antique chapel attached to the palace, which has been repaired by the late bishop, Dr. Maltby. Chichester stood a siege during the civil wars.

The average gross annual income of seven incumbents of the parishes of Chichester amounts to 664*l*., but in six of the cases other preferments are held. (*Eccl. Ret.* 1835.) The various schools, daily and Sunday, amounted in 1835 to 29; and to these has recently been added an infant school. The schools of a distinct public character are—one Bell's school, one Lancaster ditto, both very flourishing, and educating a great number of boys; each of these has a girls' school belonging to it. The infant school is intended to accommodate about 250. A boarding-school was endowed in 1702 by Oliver Whitby, Esq., for 12 boys, but from an increase in its funds the number is now augmented to 28, who are boarded and educated. This school, which is under the direction of five trustees (who must be members of the church of England, and 'not parliament men'), is admirably managed; and the boys in the increased number are not only well taught, but are clothed. Such boys as behave properly receive a sum of money on leaving the school, to enable them to settle in business, or otherwise to promote their interests. The boys wear the antient blue dress of similar foundations. The revenue is about 1300*l*. per annum, and is yearly increasing. It is by the Foundation Charter restricted to members of the church of England. Another, termed a grammar-school, was founded in 1497 by bishop Story, the revenues of which are stated in the *Education Returns* to have been collusively administered. Scarcely any of the children of the citizens are educated at it, as it is exclusively a classical school. There is an antient foundation for the support of old and infirm poor persons, called St. Mary's Hospital. (*History of Chichester*.) Like so many of the antient charitable foundations, much too large a proportion of the funds of this hospital goes to the custos, or director, who is always one of the dignitaries of the cathedral, in the chapter of which lies the patronage of the charity.

The parochial churches in Chichester are remarkable for their smallness and the poverty of their appearance. During the present year, 1836, the largest parish (the Subdeanery) was divided, and a handsome Gothic church, capable of containing a thousand persons, erected without the walls. This church, which is surrounded with an extensive cemetery, is named St. Paul's.

The chief public buildings of Chichester are the guildhall, town or county-hall, council chamber, market-house, corn exchange, market cross, jail, theatre, infirmary, and the philosophical society's and mechanics' institutions. The town-hall is a rude inconvenient building, the re-

mains of an antient monastery of Grey Friars. The council chamber, which is the official quarters of the corporation, is small, and far from ornamental; it is joined to an assembly room of large dimensions, in which most of the public meetings are held. The market-house is neat and commodious. The corn exchange is an elegant building, recently erected by subscription, and consisting of a splendid open show-room with stores for corn behind. The market cross, which stands at the intersection of the principal streets, s termed by Mr. Britton, 'the most enriched and beautiful example of this class of buildings in England.' Its form is an octagon, having a large central column, from which spring numerous bold ribs, beneath a vaulted roof; eight pier buttresses support the superincumbent panelled wall, parapet, pinnacles, and flying buttresses. There are three inscriptions on tablets, in niches, and clock-dials are inserted above them. The whole is surmounted by an open turret, of modern and inferior workmanship. The market-cross was erected by bishop Story towards the close of the fifteenth century; his arms are impaled with those of the reigning monarch on shields attached to the buttresses. The jail is small and inconvenient. The theatre is neat but small. The infirmary is a very elegant and beautiful building, situated on the northern slope outside the city, and surrounded with airing grounds for the patients. It was erected by subscription in 1826-7, and was opened for the reception of patients in October, 1827. It owes its establishment to the exertions of Dr. Forbes. It is one of the best planned and best regulated establishments in the kingdom, although of small extent; it contains about sixty beds, and is supported at an annual expense of about 1400*l.* The literary and philosophical society, which was established in 1831, and is very flourishing, has elegant and extensive premises in the South Street, with reading and exhibition rooms, and museum, which already contains a fine collection of birds and minerals, and many other articles of interest and value. Lectures are delivered regularly every winter before the members, now consisting of about 150, who pay an annual subscription of one guinea. The mechanics' institution was founded in 1829, and is also very flourishing; its present members amount to 450. In 1836 an elegant building for the purposes of the society was erected by subscription at the South Gate. Lectures before the members are regularly delivered during the winter, and are very well attended. This institution has no museum, but has an extensive well-selected library.

In 1817 an Act was passed for making a canal from Chichester harbour to the city, a distance of about a mile and a half, which forms a branch of the Portsmouth and London canal, by the way of Arundel. There is a quay on the harbour, to which vessels of 150 to 180 tons can come up at high tides. The canal has not been very profitable, as the dues are stated to equal the land carriage from the quay. The following statement shows the number of vessels with the tonnage:—

FOREIGN.				
Years.	Inwards.		Outwards.	
1830	6	410	3	120
1831	7	426	3	188
1832	5	300	2	113
COASTWISE.				
	Inwards.		Outwards.	
1830	283	23,914	256	10,342
1831	398	25,730	288	12,555
1832	385	27,408	251	9,461

The gross receipt of Customs' revenue collected at Chichester in 1833 was 1034*l.*; in 1834, 1529*l.*

Chichester has a clean, neat, and comfortable appearance; the city is well built, lighted, watered, and drained; the principal streets are spacious, and contain many large houses. There are annual horse races in the neighbourhood, at Goodwood Park, the seat of the Duke of Richmond, which attract numerous visitors. (Britton's *Picturesque Antiquities; Geography of the Society for Diffusion of Useful Knowledge; Boundary and Municipal Corporations Reports;* Hay's *Hist. of Chichester; Communication from Chichester.*)

CHICK PEA. [CICER.]

CHICKASAWS, an Indian tribe in the United States of America, inhabiting the northern portion of the State of Mississippi, on both sides of the upper branches of the rivers Tombigbee and Yazoo. They were formerly more numerous, but they have been considerably reduced by war and the small-pox. At present their number does not appear to exceed 3000. They speak a language similar to that of their southern neighbours, the Choctaws, and have made some progress in civilization; they cultivate corn, cotton, potatoes, and beet-root; and have herds of cattle, sheep, and swine. They live in comfortable cabins, and have erected a school at their own expense. A few missionaries are active in imparting religious instruction to them.

CHICKWEED, a common annual, with soft light green opposite ovate leaves, a brittle stem, and minute white petals, almost split into two parts. It and groundsel are two plants which are to be found in flower on any day in the year; botanists name it *Stellaria media.*

CHICORY is a perennial plant bearing a composite flower, which gives the name to the sub-family or section of the *chicoraceæ*, which belongs to the family *Compositæ*. It has a fusiform root like a carrot, from the crown of which large and succulent leaves spread out, with deeply indented edges. The whole plant is bitter and aromatic; and the leaves as well as the root have been used in medicine, in the form of a decoction, as a tonic bitter and diuretic. It is frequently used as a salad, especially when blanched. For this purpose, the roots are taken up in the end of autumn; they are then placed in sand or light mould, in a cellar from which the light is excluded, the leaves having been cut off previously within half an inch of the crown. Fresh slender leaves soon grow out of the root, and, being deprived of light, they are much more delicate and tender than those which grow in the open ground. The bitterness also is thus lessened, and they form a very pleasant winter salad, which, from the long, slender, and matted state of the leaves, the French call *barbe de capuçin* (monk's beard). It is pleasanter to the taste than common endive, and stimulates the stomach by its bitter and aromatic quality.

The luxuriant growth of the leaves of the chicory, and their speedy reproduction after they have been cut, suggested the more extensive cultivation of this plant as food for cattle and sheep, who are fond of the leaves. Mr. Crettó de Panuel, who cultivated it near Paris in a rich soil, produced extraordinary crops. The first year he cut it only twice, but afterwards four and five times in a year: it produced more green food than any other plant cultivated for this purpose. Arthur Young was so struck with it that he strongly recommended it to the notice of British agriculturists; and in the queries sent to various parts of the country by the Board of Agriculture, one was, whether chicory was cultivated in the district as green food for cattle. But notwithstanding its abundant produce, it has not been found so much superior to other green food as to make its cultivation general. Some accurate experiments on a large scale were made in France at the national farm of Rambouillet, to ascertain the value of chicory compared with lucerne and other green food. The chicory was declared inferior, giving a disagreeable taste to milk and butter when cows are kept upon it. For sheep it is very good, and a small portion mixed with their other food may probably be a preservative against the rot.

Chicory is now chiefly cultivated in Belgium and Germany, for the purpose of preparing from the root a powder which can be substituted for coffee. This has become a very considerable article of commerce. It was very lately introduced into Britain, and the consumption of it, and consequent demand, increased so rapidly, that the government thought proper to put a check on its importation by a duty of 20*l.* per ton on the dried root.

To have the roots in perfection, the seed should be sown, or rather drilled, in April, like that of the carrot. If sown sooner, they are apt to run to seed. The land should be rich, deep, and light. The plants should be thinned out to six inches in the rows, and most carefully weeded. In September the leaves should be finally gathered and the roots taken up, which may be done with a common potato-fork. They are then cleaned by scraping and washing, split where they are thickest, and cut across in pieces about two or three inches long. These pieces are dried by means of a slow oven or a kiln. Some nicety is required in drying, to prevent the root from being scorched and to keep the proper flavour. In this state it is sold to the merchants, packed in bags. It is afterwards cut or chopped into small pieces, and roasted exactly as coffee, ground in a mill, and packed in papers in pounds and half pounds for retail sale. When coffee, as well as all colonial produce, became too dear for the labouring classes

in France and Germany, chicory was almost universally used as the best substitute, and the taste is by many thought so grateful, that they prefer the coffee with which a fourth or a fifth part of chicory has been mixed. Chicory is said to exhaust the soil, and to require fresh ground to prevent its degenerating. Unless the soil is rich and light, the roots will not come to a good size in one season, and old roots become tough and stringy. It is only the young roots that are fit to be prepared for commerce. They lose a great portion of their weight in drying. The best preparation of the land for chicory is grass or clover. The manure should be laid on before it is ploughed up in autumn, which will accelerate the decomposition of the roots. The land should be ploughed very deep in spring, and laid light; the surface harrowed fine, and the chicory seed drilled in rows twelve inches apart, and rolled. Liquid manure spread over the ground will much accelerate the growth of the plants, which must be thinned out like turnips or carrots to six or eight inches from plant to plant.

CHIEMSEE. [Bavaria, p. 51.]

CHIHUAHUA. [Mexico.]

CHILBLAIN, a local but peculiar inflammation of the skin, commonly appearing under one of three forms. The mildest form is attended with redness, swelling, and a sense of heat and itching, often quite intolerable. In the second or severer form the colour of the swollen part is of a deeper red, sometimes of a dark blue colour, and at other times even of a purple hue. In the third or the severest form, small vesicles rise on the surface of the reddened and swollen skin, which are soon converted into sores, from which a thin irritating matter discharges, the irritating nature of which it is very difficult to alter, or to bring the sores into a state of healthy suppuration.

That the inflammation of which this troublesome complaint is the consequence is of a peculiar kind, not very well understood, surgeons conclude because they find that it is not relieved by the applications which are most beneficial in ordinary inflammation.

The exciting cause of chilblain is always cold, and more especially cold applied after the part had been previously much heated. Hence those persons are most subject to the complaint who have contracted the bad habit of going immediately to the fire when they come home in winter with their fingers and toes very cold. Hence also the chief seats of the disease are those parts of the body which are most exposed to sudden alternations of heat and cold, as the nose, ears, lips, toes, heels, and fingers. Young persons are more subject to it than adults, females than males, and it seems most frequently to attack persons of a fair skin.

The painful itching, which is perhaps the most troublesome part of this complaint, is best relieved by active and long-continued friction with camphorated spirits of wine, or with a mixture of two parts of camphorated spirits with one of Goulard's extract. Some surgeons speak highly of the efficacy of one part of the tincture of cantharides to six of the common soap liniment as a lotion. But 'one of the best modes of curing chilblains of the milder kind is to rub them with snow or ice-cold water, or to bathe them in ice-water several times a day, keeping them immersed each time until the pain and itching abate. After the parts have been rubbed or bathed in this way, they should be well dried with a towel and covered with flannel or leather socks.'

The stimulating applications, only in a more diluted form, appear also to be the best remedies when vesications arise. In this case the application of heat to the part affected should be most carefully avoided. When the vesicles terminate in sores, they require stimulating dressings.

But prevention is better than cure, and the most effectual mode of guarding against the annoyance of this irritating and often exceedingly protracted disease is to accustom the skin to moderate friction, to avoid clothing the parts too warmly, to avoid still more carefully sudden and great alternations of heat and cold; and accordingly to take particular care not to go immediately into a warm room or near a fire out of the cold air; and to wash the parts frequently with cold water. (Cooper's *Surgical Dictionary*.)

CHILE, one of the new republics on the continent of South America, lies along the shores of the Pacific between 25° and 44° S. lat.; but the archipelago of Chiloë, which also belongs to it, extends about two degrees farther south. The republic of Chile considers the whole coast to the Strait of Magalhaens, and likewise a portion of Patagonia, as belonging to its territories; but as no settlements have been formed in these countries, we shall limit our description to the tract, between 25° and 42° N. lat., which extends from the chain of the Andes, forming its eastern boundary (between 69° and 71° W. long.), to the shores of the Pacific Ocean (between 71°, 70° and 74° W. long.)

Chile is bounded on the east by the republic of La Plata, from which it is divided by the Andes. On the north it borders on the desert of Atacama, which belongs to Bolivia. On the west it is washed by the Pacific; and on the south it is separated from the island of Chiloë by the Strait of Chacao, and bounded by the Bay of Ancud.

Its extent from north to south is about 1175 miles; its breadth varies between 100 and 200 miles; and its mean may be taken at 150 miles. This would give it a surface of 176,250 square miles, which does not differ much from the calculation of Humboldt, who assigns to it an area of 14,240 Spanish leagues (20 = 1 degree), or 170,880 square miles. It is therefore about 60,000 square miles larger than the British islands.

The Andes, which from the Strait of Magalhaens as far north as the Bay of Ancud press close on the shores of the Pacific, appear to turn east at the northern extremity of that bay, but soon resume their northern direction, in which with some slight bends to the east and west they continue along the boundary line of Chile. So far as we yet know, they constitute up to 35° S. lat. one single range, about 100 miles or more in width. Between 35° and 34° S. lat. they divide into two ranges, which unite again north of 34°, and inclose the elevated longitudinal valley of Tunyan, the most southern of those valleys by which the Andes are distinguished from all other mountain ranges. About 33° 20′ the chain divides again, and incloses the longitudinal valley of Uspallata, which extends northward to 30° S. lat.: the elevation of this valley at the post-house of Uspallata was found by Miers to be 5970 feet above the sea. It belongs to the state of La Plata. No part of the Chilian Andes has been measured, except three mountain passes; but some of the numerous peaks in the chain have been estimated to rise to 15,000 and 16,000 feet. This estimate is founded on the fact that in these latitudes the snow-line is found at about 14,000 feet above the sea. The summits, which are covered with perpetual snow, are the Peak of Aconcagua (south of 32°), the Peak of Tupungato (south of 33°), the Volcano Penqueñes (near 34°), the Peak of Descabezado (north of 36°), and the Volcano of Antuco (north of 37°). The mean height of the whole range seems to be lower south of 35° than north of it, though the summits in the whole range seem to attain nearly the same elevation. This portion of the Andes contains many volcanoes. They are extremely numerous to the south of 35°, where nearly twenty are known to exist, and it is supposed that many are still unknown. Between 35° and 30° only a few occur, and at great distances from one another. Still farther north no volcano is known to exist in the Andes, between that of Coquimbo (south of 30°), and that of Atacama (south of 21°).

Several mountain-passes traverse this range. The most frequented is that of Aconcagua, which passes over the range between the peaks of Aconcagua and Tupungato, traverses the valley of Uspallata, and unites Santiago de Chile with Mendoza in La Plata. Its highest point, called La Cumbre, is, according to the calculation of Pentland, 12,454 feet above the sea. The pass of the Portillo traverses the Andes south of the peak of Tupungato, passing through the northern part of the valley of Tunyan. It seems to be the same road that Dr. Gillies measured, whose highest elevation he found to be 14,365 feet above the sea. South of the southern extremity of the valley of Tunyan, near the volcano Penqueñes, is another pass, which, according to Dr. Gillies, rises to 13,210 feet. The Pass del Planchon traverses the range between the volcano of Peteroa and the peak of Descabezado, and is less elevated than the others, since vegetation extends to its summit. The pass of Antuco, which crosses the range near the foot of the volcano of that name, probably does not rise to a great height. As it traverses the country of the independent Indians, who occupy the Pampas of La Plata, it is not much used. Besides these passes there are others over the Andes, but all of them are impracticable for mules in winter (from June to September).

The districts of Chile north of the Rio Chuapa (31° 30′ S. lat.) resemble the coast of Peru, and the whole of that country may be considered as the western declivity of the Andes. Near the high range the country is still between 6000 and 8000 feet above the sea, and it lowers gradually to the west,

till it terminates near the sea in an extensive plain, about twenty miles in breadth, and from sixty to eighty feet above the sea. The country between this plain and the chain of the Andes is very uneven, exhibiting numerous ridges of low hills, which in some parts, especially near the Andes, and near the plain along the shores, run parallel to the great chain and the Pacific; but in the intermediate country they continually change their direction. The surface of this country presents either bare rocks, or is covered with sand, and nearly without vegetation, except a few stunted shrubs, which generally occur in the narrow glens and ravines, with which it is sparingly intersected. A few rivers rising in the Andes run in deep beds through this country, but most of them have only water in the spring (September till December), when the snow is melting in the upper region of the Andes, and they are dry during eight or nine months of the year. Only three rivers, the Copiapò, Guasco, and Chuapa, have water all the year round. On their banks are the few cultivated spots, which are irrigated by water drawn from the rivers. But all the small level tracts along the watercourses are not fit for cultivation; the greater part of them are covered with incrustations of salt, which in some places are five or six inches thick, and occupy the whole surface, covering even the low grasses. The few spots which are cultivated produce only Indian corn, potatoes, a small quantity of wheat, and considerable quantities of fruits. Few countries of equal extent possess greater metallic wealth, especially gold, silver, and copper, but the extreme sterility of the country prevents the working of these mines, except when they are very rich. In climate these districts resemble Peru. It never rains, but sometimes a pretty strong dew falls in the morning, which refreshes the plants. This extreme dryness of the air is accompanied with a very moderate degree of heat, the thermometer in summer rarely attaining more than 70°; and in winter the temperature is sometimes so low, that the morning dew is changed into snow. This general description applies only to the country north of 30°, south of which line the cultivable spots are more extensive and more numerous, and the country is annually refreshed by a few showers of rain.

From the snow-capped peak of Aconcagua a mountain-ridge runs directly west, and terminates at a short distance from the sea. It is called Cuesta (ridge) de los Angeles, and attains a considerable height, which however greatly decreases as it proceeds westward. Another ridge, branching off from the Andes at the peak of Tupungato, runs first north-west, and is called Cuesta de la Dahesa: it then turns west, and may be said to terminate at the Campana de Quillota, a mountain which rises to about 2500 feet above the sea, from which it is about twelve miles distant. A much lower ridge extends farther west, terminating not far from the shore and the mouth of the Rio de Aconcagua. This westerly ridge, which is called Cuesta de Chacabuco, is traversed by the road which runs from the mountain-pass of the Cumbre, and attains in this place an elevation of 2896 feet above the sea. The country enclosed by the Cuesta de los Angeles, and those of La Dahesa and Chacabuco, is drained by the Rio de Aconcagua. This river rises on the north-west declivity of the peak of Tupungato, and runs more than one-third of its course in a narrow and elevated glen, nearly parallel to the chain of the Andes in a N.N.W. direction; it then gradually turns west, but the valley through which it flows is still narrow, till it has terminated another third of its course, when it enters the valley or plain of Aconcagua, a beautiful level tract, extending from E.S.E. to W.N.W. fifteen miles, with a breadth of thirteen where widest. This plain is about 2600 feet above the sea, but as the river has water enough to irrigate the whole, it is well cultivated, and perhaps the most populous portion of Chile. At its western extremity it lies nearly contiguous to the valley of Putuendo, which is smaller, but also fertile and well cultivated, and extends northward to the Cuesta de los Angeles. After the junction of the Rio de Aconcagua with the Rio Putuendo, the mountains again approach its bank, but soon retreat a little farther; and hence to the mouth of the river extends the valley of Quillota, which is not much inferior in fertility to the others, and is about three or four miles wide.

South of the Cuesta de Chacabuco the level country begins to occupy a much larger portion of the surface. The plain of Santiago, beginning at the foot of the range, extends south to the banks of the Rio Maypù. Towards the north it is from six to eight miles wide, but farther south it grows wider, and on the bank of the Maypù, from east to west, it is about twenty miles. Its soil is stony and dry, and it can not be cultivated where it is not irrigated. Cultivation accordingly exists only in the neighbourhood of the rivers, and of the canal, by which the water of the Maypù has been brought upon it. Miers thought that not one-tenth of the plain was under cultivation, but in this respect there has doubtless been some improvement of late years. The country between the plain and the Andes is filled by mountains of various heights, with steep declivities, and nearly without vegetation: the valleys intersecting them are narrow, and covered with an immense number of greater or smaller stones, which have fallen down from the adjacent mountains. The country between the plain of Santiago and the Pacific is traversed by some ranges of hills, which rise to no great height above the adjacent plains, and are southern offsets from the Cuesta of Chacabuco. The plains between them are pretty level, and of moderate extent: the soil is dry and stony, without water and trees.

The Rio Maypù has its sources in the Andes, between the Peak of Tupungato and that of Cauquenes, and one-third of its course lies between the high offsets of the Andes in narrow valleys. Towards the plain of Santiago its valley widens. When the river has entered the plain, the canal of Maypù conducts a portion of its waters to the centre of the plain, while the river, continuing its western course, traverses its southern portion. After its junction with the Rio de Colina, which traverses the plain of Santiago, but has water only in the rainy season, the Maypù enters the valley of Melipilli, from four to six miles wide, which contains large tracts of well-cultivated land. The whole course of the Maypù is about 160 miles.

The country south of the Rio Maypù has a different character. Towards the Andes it is covered with the high lateral branches of that range, which enclose narrow and elevated valleys. But about two-thirds of the country rise in gentle undulations, and contain comparatively few steep and high hills. Here also the rains are by no means abundant, nor do they last for any length of time: agriculture therefore cannot be carried on without irrigation, and the tracts of ground under cultivation are not extensive. To this want of moisture the naked face of the country must be attributed. No trees of large size are found in Chile north of the Rio Cachapoal, but their number increases farther south, till on the banks of the Rio Maule the forests of high timber trees become very extensive. The Rio Maule rises in the Andes at the foot of the Peak of Descabezado, near 36°, and runs first nearly due west. When it has arrived at the more level country it turns north-west, and flowing in a diagonal line, falls into the sea about 34° 40′. It is the most northern of the navigable rivers of Chile. At high tides vessels, not drawing more than six feet water, may enter its mouth, and proceed some small distance up it. Flat river-barges may ascend at any season for twenty miles and upwards. These favourable circumstances, united to the fertility of the country on its banks, and the extensive forests of timber trees, will probably soon render this river of considerable importance. The country between the Rio Maule and the Rio Biobio is still better adapted to agriculture; but since the expulsion of the Spaniards it has been nearly deserted, on account of the frequent incursions of the neighbouring Indian tribes. This tract contains much more level ground than any other portion of Chile. The Andes here terminate by a steep descent, and without offsets; and at their foot begins, in the northern districts, an undulating country, intersected with small plains. In the southern districts the level country begins immediately at the foot of the range, and extends to a considerable distance from it. The Travesia (heath) of Yumbel, a plain sixty miles long, and nearly as wide, between the towns of Yumbel and Tucapel, is covered with sand and small pieces of volcanic matter; it is without trees, water, and vegetation, except at a few spots. Poeppig thinks it probable that it was once covered with water, and formed a lake. A chain of low hills divides it on the south from the plain of the Isla de Laxa, which is nearly as large, and contains only a few low hills. This plain, which is covered with grass, is of great fertility. The country between this plain and the sea is covered with high but gently-sloping hills, which are partly clothed with wood, and partly bare and sterile. Along the rivers, especially the Biobio, the soil is very fertile.

The Rio Biobio rises in the Andes near 38°, and runs in a W.N.W. course to the Pacific, which it enters S. of 37° N. lat., after a course of about 150 miles. In its upper

course it is deep and rapid. It becomes navigable for canoes and rafts at Nascimiento, 40 miles from its mouth, which Captain B. Hall found two miles wide, though too shallow for large vessels. This river may be considered as the southern boundary-line of Chile. To the S. of it, the republic possesses only the fortress of Valdivia, and a few smaller fortresses along the S. bank of the river. These fortifications, which were erected by the Spaniards to prevent the incursions of the Araucanians, having fallen into decay during the war of independence, the Indians were enabled to overrun the southern districts of Chile, and to lay them waste Of late years the republican government has rebuilt them, and is now enabled to defend these countries against the Indians.

Though the country S. of the Biobio is included in the territories of the republic, it is, with the exception of a few small tracts, entirely in possession of the independent tribes, called Araucanos. This country, so far as it is known, is nearly covered with high trees, which frequently form impenetrable forests. The surface seems to be nearly a level up to the foot of the Andes, with the exception of a range of hills running N. and S., and the soil very fertile, as may be inferred from the great number of warriors that the Indians can send into the field. The Rio Callacalla (also named Rio de Valdivia) is by far the deepest of the rivers of Chile: sixty-gun ships can enter its mouth without great danger; but it is not known how far it is navigable. Some of the smaller rivers are also said not to have a bar at their entrance, and to form pretty safe harbours for vessels of middling size.

The climate of the central portion of Chile, of which alone we have more particular information, may be compared in some degree with that of Italy. The greatest heat occurs in the months of January and February, at which time the thermometer on the coast frequently rises to 85° during the day, and 70° to 75° during the night. The hottest part of the day is before ten o'clock in the morning, about which time wind rises in the S., which often blows with great violence. In the interior, even in the elevated valley of Aconcagua, the thermometer frequently rises to 90° and 95° in the shade; and as the southern wind is not strong here, the days are sultry, but at sun-set a delightful breeze sets in, which cools the air. The months of March and April are much more temperate, especially in the interior, and at the end of the latter months the rains generally set in. Rains fall only between May and August, and then the Andes are covered with snow, which generally lies for four or five months on the higher parts of the range. Snow and also some ice occur in the elevated valleys, but it soon melts, and the atmosphere is only chilly while the rain is falling. Snow never occurs along the sea. The number of rainy days in the northern districts is commonly fourteen, and seldom more than twenty throughout the year. This rain, which is very heavy, seldom falls for more than three days continuously. In the southern districts, where the number of rainy days is much greater, being on an average forty, the rain sometimes continues ten days without intermission. After the rainy season, in September the spring begins, which is frequently more chilly than the winter itself, and ice is sometimes observed even on the coast. Whenever an easterly wind brings down the cold air from the snow-covered Andes, the thermometer sinks in a short time 15° or 18°, but soon rises again. Summer begins towards the commencement of November, and then the sky, which, during the spring, is covered with clouds, is entirely free from them. The heat gradually increases, and in the northern districts vegetation begins to die away in December, but in the southern districts the country is always clothed with verdure, as the plants are occasionally refreshed by rain, and the dews are frequent and heavy. The mean temperature at the mouth of the Rio Aconcagua in July and August is 70°, and at Talcahuana, near Concepcion, one or two degrees less.

Chile is subject to strong periodical gales. In the beginning of the rainy season (May and June) the north and north-western winds prevail, and frequently blow with great violence. As all the harbours of this coast are open to that quarter, vessels abandon them, and weather the storm in the open sea. During eight or nine months the wind blows from the S., and frequently with great force, especially in autumn (from February to April). At the same time a current runs along the coast to the N., both which circumstances favour navigation northward, but the return to the S. is rendered very tedious and difficult. Easterly winds are rare, except in September, when, as already observed, they suddenly lower the thermometer, and in February and March. In the latter season they blow only in the valleys of the Andes, and raise the thermometer from 77° to 80° even in valleys which are upwards of 5000 feet above the sea. They blow with such a force, that they throw down the strongest trees.

Probably no country is more subject to earthquakes than Chile; they occur, however, much more frequently along the coast than in the interior. In the northern districts slight shocks are felt almost every day, and occasionally several times in a day. Sometimes they destroy the towns and lay waste a great extent of country. In 1819 the town of Copiapò was levelled to the ground, and in 1822 the damage done in Valparaiso and the country about it was not much less. In the last earthquake the rocks inclosing the harbour of Quintero, which is some miles N. of the mouth of the Rio Aconcagua, were raised four or five feet above their former level.

The climate of Chile varies much in the different districts; but it is every where so healthy, that it is difficult to determine what kind of diseases are prevalent.

Intertropical plants do not succeed; for though the heat in the northern district is great, the extreme dryness of the air is unfavourable to the growth of plants which require a long time for coming to maturity. The sugar-cane was tried some years ago, but it has been abandoned. Agriculture is limited to the productions of Europe. Indian corn is grown every where, but not to a great amount. Wheat is the staple; it is raised all over the country, and gives in many places very abundant crops, especially S. of the Rio Maule, whence considerable quantities of flour are exported to the harbours along the western coast of S. America, where it enters into competition with the flour brought from the United States. Large quantities are from time to time shipped to Cook's Land or New South Wales. Barley is grown in the southern provinces to some extent, but very little N. of the Rio Maule; oats only on a few estates, and rye is not known. Leguminous vegetables are grown abundantly, especially different kinds of beans, and supply an article of exportation. Hemp is raised in the country N. of the Rio Maypù, and grows to an extraordinary height. Since it has been ascertained that the hemp of Chile is superior even to the Russian, the state favours this branch of agriculture by granting to its cultivators many advantages. Hemp is grown in no other country on the W. coast of S. America.

Vegetables are not much cultivated, except in the countries about the capital and the most frequented parts. Potatoes however are grown in great abundance in the northern districts. Capsicum is raised in the valley of Aconcagua, and forms a considerable article in the internal commerce of the country. The quinoa (Chenopodium quinoa) is peculiar to Chile, which, in the southern provinces, is raised in abundance, and somewhat resembles millet; a pleasant beverage is made of it. Melons and water-melons, as well as pumpkins, succeed very well in the northern provinces, where they are raised in great quantities, and attain a surprising size.

Figs, grapes, pomegranates, oranges, and peaches succeed best in the most northern districts, whence they are exported to the other parts of the state. Wine is made at different places, but not yet with any great success. The best is made near Concepcion. The olive-tree succeeds as well as in Spain, and its cultivation is rapidly increasing, but the oil is bad for want of a proper method of preparing it. Extensive forests of wild apple and pear trees occur along the foot of the Andes in the southern provinces. The fruits are hardly eatable, but cider is made of them. The forests, which cover so considerable a portion of the southern provinces, contain many fine timber-trees, which form one of the more important articles of export. In the Andes S. of the volcano of Antuco, many valleys are covered with forests of the Araucaria, whose fruits contain a great number of nuts twice as large as an almond, which are very palatable, and constitute the principal food of the Indian tribe of the Pehuenches. (Poeppig.)

Cattle are very abundant north of the Rio Maule, the declivities of the mountains and high hills affording copious pasture for four or five months, and some low tracts which are sown with lucerne, for the remainder of the year. Single proprietors sometimes possess from 10,000 to 20,000 head of

cattle. Live stock, jerked beef, tallow, and hides, are large articles of export. Cheese is made on the banks of the Rio Maule and sent to Peru; and butter in the neighbourhood of the larger towns. Horses have greatly decreased in number during the last twenty years. They are of a middling size and strong; of late years horses and mules have been exported to Cook's Land and the Cape of Good Hope. Sheep are not numerous, and their wool is bad. Goats are kept by the lower classes, but are not numerous. Swine are found in abundance in the archipelago of Chiloë, whence hams are exported; on the continent they are less numerous. Pork is salted in the harbours as provisions for the vessels. The island of Mocha, between Concepcion and Valdivia, is overrun with wild horses and pigs, both of which are used as fresh stock by the whaling and sealing ships in the Pacific.

Gold dust is found in the sand of nearly all the rivers which come down from the Andes, as in the Rio de Aconcagua, Rio Maule, and Biobio. Some twenty years ago many of the inhabitants on the banks of these streams were employed in washing the gold sand, but it is now only done in a few places. Some gold mines occur in the northern districts, where they are worked, but the produce is inconsiderable. Others are said to exist in the southern provinces, but none are worked. Silver is still more abundant, but the average is only from 9 to 10 marcs (one marc = 8 ounces) in the cargo, or 5000 lbs. of ore. In 1832 however very rich silver mines were discovered about sixty miles south of the town of Copiapò, where the ore was found so rich as frequently to contain 60 or 70 per cent. of pure metal. Their working has commenced with great activity, and all the other mines are nearly abandoned. Poeppig thinks that the produce of all the silver mines, even including the rich one discovered in that year, did not exceed 120,000 or 130,000 marcs. The copper mines are very numerous in the northern districts, especially about Illapel, Coquimbo, Copiapò, and Suasco; copper is also found farther south in the Andes, but is not worked. The copper of Copiapò is most valued. Miers estimated the quantity of copper exported in 1824 at 40,000 cwt.; in 1829 it rose to 60,000; the mean may be 50,000. A small portion comes to Europe, but by far the larger part goes to India and the United States. Ores of lead, tin, and iron, are said to exist, but they are not worked.

The coal formation extends under a considerable part of the southern provinces. The coal is at present bad, but it is hoped that it will improve in quality as the mines are sunk deeper. Salt does not exist in sufficient quantity. A good deal is collected in the lakes of Bucalemu, south of the mouth of the Rio Maypù, in which the salt water of the sea is subjected to evaporation. A great quantity of salt is imported from Peru and Patagonia. The latter is collected by the Indians, partly from lakes, and partly from the sides of mountains on the eastern sides of the Andes between 36° and 40° south latitude.

The population of Chile, north of the Rio Biobio, is entirely composed of descendants of Europeans. If there has been any mixture with the copper-coloured race, it must have been very small. There are no Indians north of the Biobio, except in the valleys of the Andes south of 34° S. lat. Negroes are few in number. The population is differently stated by travellers. Miers thought that it did not exceed 560,000, but the partial census of some provinces shows that he has much underrated it. Many who have seen the country are of opinion that 1,200,000 can hardly be too much. The most recent estimates carry it even to 1,400,000. The Indians who inhabit the country south of the Biobio are known by the name of Araucanians, and have obtained some celebrity by the high degree of civilization attributed to them by Molina [ARAUCANIANS], of which, however, modern travellers have been unable to find any traces. They appear to consist of several tribes, who speak different dialects of the same language, and are divided by the Chilenos into *Indios costinos*, or Indians inhabiting the coast, and into *Moluchos*, who inhabit the extensive wooded plains stretching along the foot of the Andes. It is the latter Indians who have resisted all attempts to conquer them, and have at last destroyed nearly all the settlements established south of the Biobio. These nations derive their principal subsistence from agriculture, cultivating Indian corn, potatoes, beans, and some other articles. In the valleys of the Andes between 34° and 37° S. lat. are the Pehuenches, who seem rather to be addicted to a wandering life. All these tribes still enjoy complete independence, and frequently ravage the southern districts between the Biobio and Maule in their incursions.

The country north of the Biobio is politically divided into six provinces, to which are added the province of Valdivia, comprehending the European settlements south of that river, and the province of Chiloë, which consists of the archipelago of that name.

I. The province of Coquimbo comprehends the most northern sterile portion of the republic; and has the Rio Chuapa for its boundary on the south. It exports gold, silver, and copper, and dried fruits. Its mines, which are the richest in Chile, are worked chiefly in the neighbourhood of the small towns of Coquimbo, Copiapò, Huasco, and Illapel. The capital is Ciudad de Serena, a small town with about 4000 inhabitants, situated somewhat more than six miles from the bay of Coquimbo.

II. The province of Aconcagua contains the valley of the Rio Aconcagua, and the countries north of it to the Rio Chuapa. It exports cattle and wheat, and has some rich mines of gold and copper. The capital, S. Felipe, or Villa Vieja de Aconcagua, contains above 10,000 souls. In the valley there are also Quillota, with 8000 inhabitants, and S. Rosa, or Villa Nueva de Aconcagua, of nearly equal size. Near Petorca there are rich mines of silver.

III. The province of Santiago comprehends the plains along the foot of the Andes on both sides of the Rio Maypù, and the hilly and in some places mountainous country between the plains and the Pacific. It contains few mines, and their produce is small. Its wealth consists in wheat and cattle. It contains the capital of the republic, Santiago, and the most frequented harbour, Valparaiso. Rancagua, towards its southern boundary, is a place of some importance.

IV. The province of Colchagua extends between the rivers Cachapoal and Maule, and comprehends a country partly level and partly hilly. It is of great fertility, and produces corn in abundance; cattle are also very numerous. It does not appear that there are any precious metals. In this province the immense forests begin which cover so considerable a portion of the south; farther north there are no forests. The capital, San Fernando, apparently one of the most considerable towns of the republic, is situated in a very fertile country. Talca is also a place of some note.

V. The province of Maule extends from the Rio Maule to the Rio Itata, and to its upper branch the Rio Ruble. It produces corn, wine, and tobacco, and is partly covered with lofty forest trees. It is probably the most fertile part of Chile, and consists mostly of an undulating country and some small plains. Copper abounds in some places; but cattle constitutes the principal wealth of the inhabitants. The chief town is Villa de Cauquenes, a small place situated in a well-cultivated plain.

VI. The province of Concepcion lies between the rivers Itata and Biobio, and comprehends the sandy plain of Yambel and the fertile plain of Isla de Laxa, with the hilly country extending between the plains and the sea. It is less fertile than Maule, a great part of its surface being occupied by the Travesia de Yambel and the sandy hills between it and the sea; but the remainder is very fertile, especially the plain of Laxa. Corn and timber are the principal exports. The capital is Concepcion. Chillan, in the interior, was formerly a place of some importance, but has been much reduced of late years by repeated invasions of the Indians.

VII. The province of Valdivia comprehends the countries between the Rio Biobio and the Bay of Ancud; but nearly all this tract is occupied by independent Indian tribes. Except the towns of Valdivia and Osorno, the European settlements are limited to a small number of fortifications along the banks of the Biobio, among which Nascimiento is the most important. Timber and a little corn are exported. The capital is Valdivia. Osorno, a small town, lies in 40° 20′ S. lat.

VIII. The province of Chiloë. [CHILOE.]

Chile is probably the only American state formerly subject to Spain whose commerce has increased since the separation from the mother country. The importations in 1832 amounted, according to a rough estimate of the merchants of Valparaiso, to about 1,000,000*l.*, and the exportation, including the transit commerce, did not fall much short of 1,500,000*l.* In Poeppig's 'Travels' the following table is given:

Countries and Harbours.	Articles of Import.	Articles of Export.
Bolivia: Cobija.	Bullion.	European and Indian goods; fruits.
Peru: Arica, Islai, Pisco, Lima, Lambayeque, and Paita.	Tobacco, sugar, cotton, rice, bullion, salt, spirits.	European and Indian goods; wheat, flour, wine, raisins; tallow, jerked beef, almonds, walnuts, timber.
Ecuador: Guayaquil.	Hats, sole-leather, cacao, bullion.	The same.
Central America: Realejo, S. Salvador, Guatemala.	Indigo, cigar-matches, dyeing wood, cochineal, saffron, balsams, hides, sugar, coffee, pearls.	European and Indian goods; wine, spirits, flour, fruits.
Mexico: Acapulco, S. Blas, Guaymas.	Bullion; sometimes sugar.	The same.
Manila.	Sugar, hats of palm-leaves, indigo.	Bullion.
China: Canton.	Silk goods; nankeens; tea, sugar, and some small articles.	Copper and bullion.
East Indies: Calcutta.	Sugar, coarse cotton goods.	Copper.
La Plata: Buenos Ayres.	European goods; produce of Brazil, sugar, maté.	Wheat, barley, beans, &c.
Brazil: Santos, Rio Janeiro.	Coarse cotton linen, called *tocuyos*.	Wheat, fruits, bullion.
United States: Baltimore, New York, Salem, Boston.	Tobacco, spermaceti candles, oil; European and Indian goods; sugar from Havanna and Brazil, &c.	Hides, copper, seal-skins, bullion.
Spain: Cadiz and Gibraltar (by neutral vessels).	Wine, oil, quicksilver, paper, and some silk goods.	No direct exportation.
France: Bourdeaux, Hâvre—rarely Marseilles or Nantes.	Wine, brandy, silk goods; linens, cloth, hardwares; paper, perfumes; books; calf-leather, goat-leather.	Bullion, hides, and sometimes copper.
England: Liverpool and London.	Cotton and woollen goods; iron, hardwares, and iron utensils; crockery, &c.	Bullion, hides, and copper.
Germany: Hambro', Bremen.	Linens, cloth, glass; iron utensils; silk and cotton goods, spirits.	Bullion.
Belgium: Antwerp.	Cloth, and English, German, and French manufactured goods.	Bullion, hides.

Somewhat more than one third of the whole commerce is said to be in the hands of the English, about one-third belongs to the North Americans and French, and the remainder to the other European and American nations. [VALPARAISO.]

The revenues of the republic, from 1825 to 1830, amounted to 1,736,800 Spanish dollars: in 1831 only to 1,509,000, and in 1832 to 1,634,633. In 1832 they were estimated at 1,685,000; but up to the year 1832 the expenses exceeded the revenue, and the interest on the English loan of 1,000,000*l.* has not been paid. The army consisted in 1832 of 3200 men, besides the militia, which was estimated at 20,000. The navy, which formerly consisted of 12 vessels, was reduced in 1832 to two small vessels.

When Francisco Pizarro had overthrown the empire of the Incas in Peru, he sent Almagro to subjugate Chile. With great loss of men, Almagro, passing over the Andes and through the desert of Atacama, entered the northern provinces without resistance, these districts having previously been dependent on the Peruvian empire. But farther south he met the more warlike tribes, and made no great progress. His successor, Valdivia, advanced to the Biobio, and founded the town of Santiago in 1541. For more than 200 years the Spaniards tried to establish their authority in the south, but without permanent success; and in 1771 they were obliged to abandon that country, with the exception of Valdivia, Osorno, and a few small fortresses on the banks of the Biobio.

The first disturbances tending to a separation from the Spanish dominion occurred in 1810, and went on increasing till the Chilenos were defeated in 1814 at Rancagua, by the Spanish general Osorio. In 1817 San Martin entered Chile with an army from La Plata, and liberated the country by the battles of Chacabuco (12th February, 1817) and Maypu (5th April, 1818). The new government has a republican form; the provinces, however, do not constitute separate states, but have a central legislature and executive. The executive power is in the hands of a supreme director. The congress is composed of a senate, consisting of twenty members at the utmost, and of a house of representatives, to which a deputy is sent for every 15,000 souls. Since the establishment of the constitution, the conflict of the political parties has been nearly continuous, and the country has not yet derived from this change those advantages which were anticipated. (Molina; Miers; Meyen; *Reise um die erde in* 1830—32; Poeppig, *Reise in Chile, Peru, und auf dem Amazonenstrome in* 1827—32.)

CHI'LIAD (from χιλιάς) is (or rather was) used to mean a thousand consecutive numbers. Thus from 1 to 1000 forms the first chiliad, from 1001 to 2000 the second, and so on.

CHILINA, a genus of testaceous mollusks, separated by Mr. Gray from *Auricula*, and including *Auricula Dombeiana* of Lamarck, and *Auricula fluviatilis* of Lesson. Locality, South America, in fresh-water streams, with most of the habits of the *Limneæ*.

CHILLIES. [CAPSICUM.]

CHILLINGWORTH, WILLIAM, was the son of William Chillingworth, mayor of Oxford, where he was born in October, 1602. In 1618 he was a scholar, and in 1628 a fellow, of Trinity College in that University. Some curious memoirs of him are preserved by Anth. Wood (*Athen. Oxon.* c. 20), who says 'he would often walk in the college grove, and dispute with any scholar he met, purposely to facilitate and make the way of *wrangling* common with him, which was a fashion used in those days, especially among the disputing theologists, or those who set themselves apart purposely for divinity.' The comparative merits of the English and Romish churches were at that time a subject of zealous and incessant disputation among the university students; and several learned Jesuits succeeded in making distinguished proselytes among the Protestant clergy and nobility. Chillingworth, being an able disputant, was singled out by the famous Jesuit Fisher, alias Johannes Perseus (*Biblioth. Soc. Jesu*), by whom he was convinced of the necessity for an infallible living 'Rule of Faith.' On this he at once adopted the Catholic system, wrote out his reasons for abjuring Protestantism, and joined the Jesuits in their college at Douay.

After the lapse of a few months, the arguments addressed to him by his godfather, Dr. Laud, then bishop of London, induced him to abandon Catholicism, and he returned to Oxford in 1631, where he passed about four years in reconsidering the Protestant tenets. The great work of Daillé on the Fathers, which then first appeared, is said to have finally determined him.

In 1635 he published his 'Religion of Protestants, a safe way to Salvation.' It excited great attention, and passed through two editions in less than five months. For an account of the circumstances which occasioned this work, and for a list of the publications connected with the controversy, see Kippis's *Biog. Brit.*, vol. iii., p. 511. The principle of Chillingworth is, that the volume of Divine Scriptures, ascertained to be such by the ordinary rules of historical and critical investigation, is to be considered the sole authority of Christians, to the utter exclusion of ecclesiastical tradition. His boldness in asserting the principle of private judgment was opposed as much by the Puritans as by the Catholics; and while the Jesuit Knott, alias Matthias Wilson (*Biblioth. Patrum Soc. Jesu*, p. 185), contended that he 'destroyed the nature of faith by resolving it into reason,' Dr. Cheynell 'prayed that God would give him new light to deny his carnal reason, and submit to faith.' These were two of the most determined of Chillingworth's antagonists. Cheynell was one of the assembly of divines who, in 1646, was sent to convert the University of Oxford. (See *Midsummer Moon, or Lunacy Rampant, being a Character of Master Cheynell*, 1648.) Chillingworth in the mean time, unable to reason his conscience into an approval of the 39 Articles, refused to accept any preferment in the church. His long letter on the subject to Dr. Sheldon (afterwards archbishop of Canterbury), a most interesting document, is given in his Life, by Des Maizeaux, p. 86, and in Kippis's *Biog. Brit.* Nothing can be stronger than the expressions of refusal to subscribe with mental reservation. 'If I subscribe,' says Chillingworth, 'I subscribe my own damnation—if I will not juggle with my conscience and play with God Almighty I must forbear—to say the 4th Commandment appertains to Christians is false—the damning sentences in Athanasius's creed are most false, and in a high degree presumptuous—I am firmly and immovably resolved that if I can have no preferment without subscription, I neither can nor will have any.' However, in a very short time he was completely persuaded by the arguments of Drs. Sheldon and Laud, that peace and union are the real object of subscription, not belief or assent—a doctrine held by Archbishop Sancroft and many other eminent divines. Accordingly he accepted the chancellorship of Salisbury with the prebend of Brixworth, Northamptonshire, annexed; and in the subscription-book of Salisbury cathedral are recorded the words, 'Ego Gulielmus

Chillingworth, omnibus hisce articulis, et singulis in iisdem contentis volens, et ex animo, subscribo; et consensum meum iisdem præbeo, Jul. 20th, 1638.' Chillingworth, in 1640, was deputed by the chapter of Salisbury as their proctor to the Convocation in London. He was attached very zealously to the royal party, and wrote a treatise (unpublished) on 'The Unlawfulness of resisting the lawful Prince, although most impious, tyrannical, and idolatrous.' Being present in the army of Charles I. at the siege of Gloucester, August, 1643, he acted as engineer, and devised the construction of engines, in imitation of the Roman *testudines cum pluteis*, to assault the rebels and take the city by storm. Having accompanied the king's forces under Lord Hopton to Arundel castle, he was there with his comrades taken prisoner by the parliament army under Sir William Waller; and falling ill he was thence conveyed to the Bishop's palace at Chichester, where he died and was buried in Jan. 1644. In his epitaph (*Gent. Mag.*, vol. lxiv., p. 697), on the mural monument in that cathedral, he is styled 'Propugnator invictissimus Ecclesiæ Anglicanæ.' A singular scene occurred at his funeral. Dr. Cheynell, then rector of Petworth, appeared at the grave, with the work of Chillingworth (*Relig. of Protest.*) in his hand, and after an admonitory oration on the dangerous tendency of its rationalism, he flung it into the grave, exclaiming, 'Get thee gone, thou cursed book, which hast seduced so many precious souls—get thee gone, thou corrupt rotten book, earth to earth, dust to dust, go rot with thy author!' He afterwards published 'Chillingworthi Novissima, or the Sicknesse, Heresy, Death and Burial of Wm. C., with a prophane catechism collected out of his works, by F. Cheynell, Fell. Mert. Coll. Ox.,' 1644 and 1725. In this singular production the object of the author's enmity is jeered at as 'this man of reason whose head was as full of scruples as it was of engines.' But the character and abilities of Chillingworth have been greatly and justly extolled by many of our most distinguished writers. 'The incomparable Chillingworth,' says Dr. Tillotson, 'is the glory of his age and nation.' 'If you would have your son to reason well,' says Locke (*on Educat.*), 'let him read Chillingworth;' again (*on Study*), 'For attaining right reasoning I propose the constant reading of Chillingworth: for this purpose he deserves to be read over and over again.' Anth. Wood says that, 'having spent all his youth in disputation, he was a most subtle and quick disputant, and would often put the king's professor to a push.' Hobbes observes that 'he was like a lusty fighting fellow driving his enemies before him, and often giving his own party smart back blows.' 'Those,' says Mosheim, 'who desire to know the doctrines of the Church of England, must read especially Chillingworth's admirable book, The Religion of Protestants.' Gibbon observes that Chillingworth most ably maintains the principle that the protestant's sole judge is the Bible, and its sole interpreter, private judgment. Dr. Reid considers him 'the best reasoner and most acute logician of his age;' but Anth. Wood's opinion is not outdone by any, for he declares that 'Chillingworth had such extraordinary clear reason that if the great Turk or the Devil could be converted, *he* was able to do it.' 'His great excellency consisted,' says Dr. Barlow, 'in his acquired logic, the syllogisms of Aristotle and Crakenthorp having been a principal part of his studies.' The result of this proficiency in 'wrangling' is stated by his intimate friend Lord Clarendon, who says (*Hist. Rebell.*) that 'Chillingworth had contracted such an irresolution and habit of doubting, that at last he was confident of nothing.' This fact is adduced by Dugald Stewart (*Philos.* vol. ii., p. 279) as an instance of the ruinous effects of the scholastic logic. It is said by Clarendon that 'Chillingworth was a man of little stature,' and that it was 'an age in which many great and wonderful men were of that size.' The 10th and best ed. of *The Relig. of Protest.* is that in fol., 1742, with sermons, &c. and a life of the author by Dr. Birch. An edition of Chillingworth's whole works has been recently published in 1 vol., 8vo. For evidence that Chillingworth was not a Trinitarian, see Whitaker's 'Origin of Arianism,' p. 482, 492. A complete list of his miscellaneous controversial works is given in Kippis's *Biog. Brit.*, vol. iii., p. 515, and in the *Life of Chillingworth*, by Des Maizeaux, 8vo., 1725.

CHILOE, an island situated on the western coast of South America, between 41° 48′ and 43° 50′ S. lat., and 73° 20′ and 74° 30′ W. long. It is the most northern of that series of larger and smaller islands which skirt the western coast of South America from Cape Horn northwards. It is divided from the continent by a wide strait, called the Gulf of Ancud, and at its northern extremity by the much narrower strait of Chacao. It extends from north to south about 120 miles, and from east to west sixty, where widest; but its eastern coast being deeply indented, the average width probably does not exceed forty miles. This gives an area of 4800 square miles. It is therefore nearly 900 square miles larger than Corsica, about 1000 square miles less than Yorkshire, or about double the area of Devonshire. The whole island is one mass of rock, which in no part rises to a great height, and is covered with earth and clothed with wood, chiefly consisting of a species of bastard cedar, very durable, and affording excellent timber, which is exported in great quantities to Chile and Peru. In the island itself it is used for building vessels. The northern and eastern coasts, which are much indented, have many excellent harbours, among which the best are Chacao, S. Carlos, Dalcahue, and Castro, in all of which vessels of any size may anchor with the greatest safety. On the west coast is the Lagoon of Cucao, which is upwards of twenty miles in length, and connected with the sea. Though frost and snow are hardly known, the climate of the island is chilly. The air is so damp that fogs occur almost daily during the rainy season, which lasts ten months; yet the climate is healthy. The domestic animals are cattle, horses, sheep, and swine. Some hides are exported, and also nearly 8000 hams annually, of excellent quality. These with about 260,000 planks constitute all the articles that are sent out. Sometimes grain is exported. The soil being of excellent quality produces rich crops of wheat and barley, and great quantities of potatoes. A good deal of butter is made, but it does not yet form an article of commerce. Fish, as well as oysters and other shell-fish, are very abundant, and in some parts are the chief food of the inhabitants.

The interior of the country is not known, the inhabitants living all along the sea-shore, or only at a little distance from it. The northern and eastern coasts are settled by Europeans, but at the southern extremity only Indians in small numbers are found. The people are in appearance more like northern Europeans than Spaniards, being athletic and robust, and having a fair complexion and light flaxen hair. The principal towns are S. Carlos, on the strait of Chacao, a small town with about 2000 inhabitants, and Castro, which is somewhat larger. The Gulf of Ancud contains a great number of smaller islands, of which about thirty-two are inhabited. The most remarkable are Quinchau, Lemuy, Calbuco, and Llaicha. On Lemuy very good ponchos are made from the wool of the country.

All these islands form together the Chiloë archipelago. They constitute the most southern of the provinces of Chile. This province includes also the small fortress of Maullin, which is situated on the mainland near the western entrance of the strait of Chacao, and is the most southern European settlement in America.

The province of Chiloë contained in 1832 a population of 43,382, and 31 schools, in which 1271 boys received instruction. It sends three representatives and two senators to the congress. (Poeppig's *Travels in Chili, Peru, &c.*, in German.)

CHILO′GNATHA, according to Latreille, a family of insects of the order of *Myriopoda*. Technical characters:—Body generally cylindrical, and consisting of numerous crustaceous rings or segments; the head is furnished with two short seven-jointed antennæ, and two mandibles; the horny substance of the mandibles does not continue uninterruptedly from the base to the apex, but is divided in the middle, so that the upper part is, as it were, hinged to the lower by a tough membrane; they are covered above by the fore part of the head, which forms a kind of upper lip, and beneath by an under lip; this last part is divided externally into four portions by three sutures; the two central portions are narrower than the outer ones, and spring from a plate of a semicircular shape; the apex of the under-lip is furnished with several large tubercles. The first segment of the body, or that next the head, is considerably larger than the following segments. The legs are short, very numerous, and terminated by a simple hook; the anterior segments of the body are, some of them, unprovided with legs, and others have a single pair each; the remaining segments (with the exception of the two or three last), commencing from the fourth, fifth, or sixth from the head, are each furnished with two pairs of legs.

The sexual organs of the male are situated behind the

seventh pair of legs, and those of the female behind the second pair.

The respiratory orifices are situated on the sternal part of each segment of the body; they communicate internally with a double series of pneumatic sacs which extend the whole length of the body, and from which the tracheal branches spring, and spread over the other organs; these sacs are not connected with each other, as is usually the case, by a principal trachea.

A series of pores on each side of the body have been mistaken for the stigmata, but their orifices give vent to an acid liquid secretion which has a very disagreeable odour, and probably serves as a means of defence.

The chilognathæ crawl slowly and appear to glide over the ground; and when touched they will roll themselves up spirally. They feed upon decaying animal and vegetable substances, and constitute the genus Iulus of Linnæus. [IULUS.]

CHILOMANAS. [PHYTOZOARIA.]

CHILO'PODA, according to Latreille, a family of insects of the order *Myriopoda*. This family is synonymous with the order Syngnatha, Leach, and the genus Scolopendra of Linnæus. The characters are—antennæ thick at the base, and gradually growing slender towards the apex, composed of fourteen or more joints; the mouth consists of two mandibles, which are furnished with a palpiform process, and provided at the apex with numerous little denticulations; covering these is an upper lip and an under lip; the latter is composed of four distinct portions, of which the two outer parts are the largest, and transversely jointed: above this part (viewing the head from beneath) are two palpi, which resemble legs in being terminated by a pointed claw: covering this underlip, there is a second lip, an organ furnished with two lateral processes, each of which is terminated by a large bent claw, which is said to be perforated beneath by a hole through which a poisonous liquid is ejected.

The body is depressed, composed of numerous segments, which are covered above and beneath with plates of a horny substance, and each segment is generally furnished with a pair of legs; the last pair are thrown back. The sexual organs are placed at the posterior extremity of the body. The organs of respiration consist wholly or partly of tubular tracheæ. The stigmata are placed on the sides of the body.

These insects are carnivorous, and crawl about by night. Most of them are very active in their movements, and some emit a phosphoric light. They conceal themselves under stones and fallen trees, and are all found in rotten wood. In hot climates some of the species grow to an immense size (especially those of the genus Scolopendra, as it is now restricted), and, owing to their venomous bite, are much dreaded by the inhabitants of those parts.

The animals commonly known by the name of centipedes belong to this family. [SCOLOPENDRA.]

CHILTERN HUNDREDS. A portion of the high land of Buckinghamshire is known by the name of the Chiltern hills. 'Formerly these hills abounded in timber, especially beech, and afforded shelter to numerous banditti. To put these down, and to protect the inhabitants of the neighbouring parts from their depredations, an officer was appointed under the crown, called the steward of the Chiltern Hundreds;' (*Geography of Great Britain*, by the Society for the Diffusion of Useful Knowledge.) The duties have long since ceased, but the nominal office is retained to serve a particular purpose. A member of the House of Commons, not in any respect disqualified, cannot resign his seat. A member therefore who wishes to resign, accomplishes his object by accepting the stewardship of the Chiltern Hundreds, which being held to be a place of honour and profit under the crown vacates the seat. This nominal place is in the gift of the chancellor of the exchequer.

CHIMÆ'RA, a genus of cartilaginous fishes allied to the sturgeon and shark sections. [STURIONIDÆ.]

CHIMA'PHILA CORYMBO'SA (Pursh), the Pyrola umbellata of Linnæus, corymbose *Wintergreen*, a small evergreen woody plant, common in the pine-forests of the north of Europe, also found in Asia, and in North America, to the Indian inhabitants of which its virtues have been long known. The leaves possess diuretic properties joined to a tonic power, and they impart strength and comfort to the stomach while they increase the action of the kidneys. Applied externally, they cause redness and vesication of the skin. Chemical analysis shows them to consist of tannin, resin, and an acrid extractive. The taste is at first sweet, afterwards bitter. Their tonic and diuretic properties render them valuable remedial agents in dropsies, especially such as follow acute diseases. They have also been given advantageously in intermittent, and even typhus, fever. Dr. Chapman ascribes a diaphoretic power to them. Infusion, decoction, and extract are the forms in which they have been given: decoction is preferable, of which some ounces may be given repeatedly during the day. (See *Trans. of Medico-Chirurg. Society*, vol. v.)

CHIMAY. [HAINAULT.]

CHIMBORA'ZO, a mountain mass, forming one of the higher summits of the Andes. It is situated between 1° and 2° S. lat., and between 79° and 80° W. long., in the republic of Ecuador, nearly at an equal distance from the towns of Quito and Guayaquil. It is on the western of the two parallel ranges, which here constitute the highest portion of the whole chain. Its summit, as determined by Humboldt, rises nearly 21,600 feet above the level of the sea. The snow-line in the neighbourhood of the equator being about 15,750 feet, the summit of the mountain is 5850 feet, or more than one-fourth of its height elevated above it. Since the visit of the French mathematicians to Peru to measure a degree of the meridian, Chimborazo has been considered the highest summit in America, and generally on the globe. But towards the close of the last century it was ascertained that some of the summits of the Himalaya mountains rose to a greater height; and within the last ten years it has been proved that the highest portion of the Andes does not lie near the equator, but between 14° and 17° S. lat., where at least four summits rise higher than Chimborazo: the highest of them, the Nevado di Sorato, rises to 25 250 feet, or nearly 4000 feet higher than Chimborazo. (Humboldt; Pentland, in *London Geographical Journal*, vol. v.)

CHIMES, a set of bells tuned to the modern musical scale, and struck by hammers acted on by a pinned cylinder or barrel, which revolves by means of clock-work. The term is also applied to the music, the tune, produced by mechanical means from the bells in a steeple, tower, or common clock.

Chimes differ from Carillons (as the last word is commonly understood in England), inasmuch as the bells of the former are acted on by clock-work, those of the latter by keys struck by the hand. But the French apply the term *carillon* to the tune played, and, generally, to the series of bells, whether sounded by machinery or by hand; though the most accurate writers distinguish the latter kind as *le carillon à clavier*. The *carillons à clavier* comprise three octaves of bells, sounded by means of keys, similar to the pedals of an organ, which the performer strikes forcibly with hands clenched and sideways, the little fingers being guarded by a thick covering of leather. These keyed-carillons are found in many towns of Holland and the Netherlands. At Ghent they are remarkable; but the best specimen is at Amsterdam, where the *carilloneur* (M. Pothoff, formerly an organist in that city) used to display an extraordinary command of the instrument, on which he executed pieces in three parts—the base by means of pedals—with a rapidity rarely exceeded by judicious performers on the organ.

CHIMNEY. [HOUSE.]

CHIMNEY-SWEEPER, a person whose trade it is to cleanse foul chimneys from soot. The actual sweepers are boys, formerly of very tender age, who are taught to climb the flues, and who, from the cruelties often practised upon them by their masters, have, for the last half century, become objects of particular care with the legislature. The first and chief act by which regulations concerning them were enforced was the 28th Geo. III., c. 48. It has been since followed by Act 4 & 5 Will. IV., for the better regulation of Chimney-sweepers and their Apprentices, and for the safer Construction of Chimneys and Flues, passed 25th July, 1834. From that date no child who is under ten years of age can be apprenticed to a chimney-sweeper. The law is so tender with regard to these generally friendless children, that it has appointed a particular form of indenture for them. About the beginning of the present century, a number of public-spirited individuals joined in offering considerable premiums to any one who would invent a method of cleansing chimneys by mechanical means, so as to supersede the necessity of climbing-boys. Various inventions were in consequence produced, of which the most successful was that by Mr. George Smart. The principal

parts of the machine are a brush, some hollow tubes which fasten into each other by means of brass sockets, and a cord for connecting the whole together. The unskilful use of the machine, however, and the antiquated and peculiar construction of a great many of the chimneys of the metropolis, have prevented the universal adoption of what had received the significant appellation of 'the last chimney-sweeper.' Till the passing of the last Act, the little chimney-sweeper used to announce his vocation as he traversed the streets of London by crying 'Sweep.'

CHIMONA'NTHUS, a Japanese genus of Calycanthaceous plants, whose species or varieties are called in the gardens Japan allspice. They are deciduous plants, with opposite pale-green, sharp-pointed, rather rough leaves, of an ovate-lanceolate figure. About the end of November these fall from the bushes, and are succeeded by the flowers, which appear at Christmas-time upon the naked branches. They consist of an inferior calyx, formed of a considerable number of roundish scale-like sepals, the outermost of which are pale brown, the innermost semi-transparent, with some tinge of yellow. The petals are yellowish ovate leaves, staind with chocolate red veins, and surrounding a small number of stamens. The fruit is a bright brown leathery calyx-tube, enclosing three or four oblong bright-brown polished nuts. There is probably no plant more deliciously fragrant than this, the orange and violet not excepted; the plant is quite hardy if protected a little by a wall or by palings. Three varieties are known in the gardens; the common kind with small pale-yellow flowers; the *grandiflorus* with large bright-yellow flowers; and another with flowers resembling those of the first, except in being very much smaller. The last is not worth cultivating; both the former should be found in every garden, however small; nothing can be more elegant as room ornaments than handsful of their round flowers placed on little porcelain trays.

CHIMPANZEE, the name by which one of those forms which approach nearest to man is most generally known. The term has been applied to the *Simia Satyrus* of Linnæus, the *oriental orang*, but zoologists are now agreed in its proper application to the *Black* or *African Orang* or *Pygmy*. (*Troglodytes niger* of Geoffroy, *Simia Troglodytes* of Blumenbach.) Linnæus placed the form under the genus Homo, with the specific name *Troglodytes*, next to *Homo Sapiens*, arranging, as we have seen above, the Asiatic orang under the *Simiæ;* but he seems to have confounded the two species of orangs, which differ very considerably; for he refers to the figure given by Bontius which was intended for the Asiatic, and yet he gives, quoting Pliny, the] borders of Ethiopia as its habitat, as well as Java, Amboyna, Ternate, and Mount Ophir in Malacca. That the Chimpanzee, though much of its organization bears a striking resemblance to that of man, is separated from him by a wide interval, the accurate investigations of modern anatomists sufficiently prove. Tyson, Camper, Blumenbach, Cuvier, Lawrence, and Owen, have set that question at rest, though Bory de St. Vincent struggled hard to retain man and the orangs as members of the same zoological family. Before we refer to the arguments of the last-named zoologist, it will be necessary to apprize the reader that, to say nothing of the difference of organization in other parts of the body and foot, the heel-bone (*os calcis*) of man does not project backwards so far in proportion as that of the Chimpanzee, and Lawrence notes this as an infallible human characteristic; '*ex calce* hominem.' Bory de St. Vincent, and those who support the theory of gradual development of animal form, endeavour to show that the position of the great toe, upon which its conversion into an opposable organ, or thumb, and the consequent transmutation of the foot into a hand, principally depends, is a character subject to modification; and, after a somewhat sweeping assumption, that it is the only difference of organization between the orangs and man, points the whole strength of his argument against its value as a zoological character; and, by a rather retrograde process of reasoning, endeavours to support his views by giving an instance where man, under certain circumstances, obtains a prehensile power of foot. Calling in aid the *Resiniers* of the landes of Aquitaine, he exhibits them as having acquired a power of opposing the great toe to the others, a faculty supposed to have been arrived at by their scansorial habits in obtaining their living, by gathering the resin of *Pinus maritima*. 'But,' as Owen well observes, 'supposing the extent of motion of the great toe to be sufficiently increased by constant habits of climbing, or in connexion with a congenital defect of the upper extremities, yet it does not appear that the *os calcis*, or the other bones of the foot, have lost any of those proportions which so unerringly distinguish man from the ape.' M. Bory, however, in his zealous endeavours to lower the arrogance which makes man unwilling to fraternize with apes and monkeys, is carried so far as to give vent to this naïve question. 'En effet, quatre mains ne vaudraient elles pas mieux que deux comme élémens de perfectibilité?' 'In fact, are not four hands of more value than two as elements of perfectibility?' Now let us look at this fallacy, for a fallacy it is. There might be a little, and a very little after all, in the query, if any one of the four hands of the *Quadrumana*, or all of them put together, approached the hand of man as an instrument of action,—an instrument whereby, though born the most helpless of animals and without clothing or any natural protection, he has made himself master of all, and compelled the apparently most impracticable natural productions to minister not only to his wants, but to his most luxurious imaginations. Let any one who is at all conversant with animal mechanics look at the hand of a chimpanzee, and compare it with his own; or let any one observe the chimpanzee using his apology for a thumb, and then cast his eyes on the merest hodman at his work, and he will soon see where the advantage lies. And this is not all. 'To give due force to this proposition,' says Owen in his excellent paper 'On the Osteology of the Chimpanzee and Orang Utan,' 'the four hands of the ape ought to be independent of any share in stationary support or progression; now, it is scarcely necessary to observe, that the perfection of the hands of man results, in a great measure, from the free use he is enabled to make of them in consequence of the organization of the lower members as exclusive instruments for sustaining and moving the body. It has, however, been suggested that the *hallux* (thumb) of the orang might acquire increased length and strength during the efforts of successive generations to maintain the erect position; but if we look a little further into the anatomy of the orangs, a difficulty presents itself unforeseen by Lamarck. The muscle called *flexor longus pollicis pedis* terminates, in the human subject, in a *single* tendon, and its force is concentrated on the great toe, the principal point of resistance in raising the body upon the heel. In the orang, however, the analogous muscle terminates in *three* tendons, which are inserted separately and exclusively in the three middle toes, obviously to enable these to grasp with greater force the boughs of trees, &c. It is surely asking too much to require us to believe that, in the course of time, under any circumstances, these three tendons should become consolidated into one, and that one become implanted into a toe, to which none of the three separate tendons were before attached. The myology of the orangs, to which I may hereafter endeavour to direct more attention than it has yet received, affords many arguments equally unanswerable against the possibility of their transmutation into a higher race of beings.' From the same author we take the following summary comparison of the *chimpanzee* and *orang utan* with each other, and with *man*.

The *chimpanzee* differs osteologically from the *orang*: 1. In having the cranium flatter and broader in proportion to the face. 2. In having the supraciliary ridges more developed, and in the absence of the interparietal and sagittal crests. 3. In the junction of the temporal with the frontal bones. 4. In the greater proportional breadth of the inter-orbital space. 5. In the more central position and less oblique plane of the occipital foramen. 6. In having but one anterior condyloid foramen on each side, while the orang has two. 7. In having generally but one suborbital foramen on each side, while the orang has three or more. 8. In the persistence of the cranial sutures. 9. In the earlier obliteration of the maxillo-intermaxillary sutures. 10. In the smaller proportional size of the incisive and canine teeth, and consequent smaller development of the jaws, especially of the intermaxillary bones. 11. In the smaller proportional size of the cervical, and larger proportional size of the lumbar vertebræ. 12. In the additional dorsal vertebra corresponding to the additional pair of ribs 13. In the more complete composition of the sternum which consists of a single and not double series of bones, as in the orang. 14. In the greater sigmoid curve of the clavicle, which in the orang is nearly straight. 15. In the less

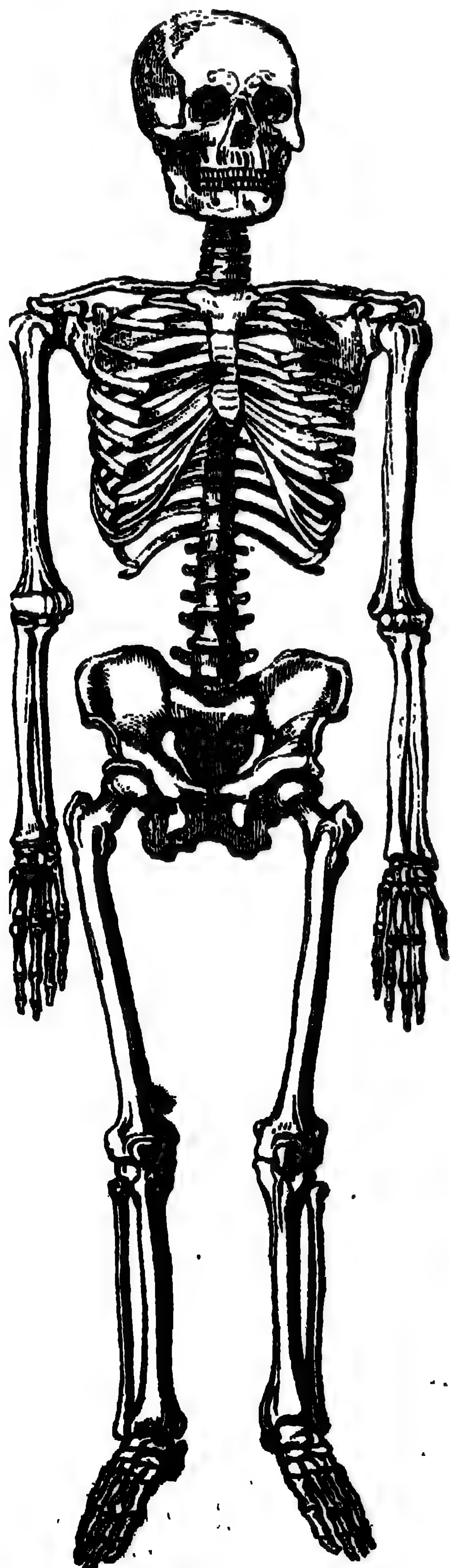
proportional breadth of the *scapula*, and the more lateral aspect of the glenoid cavity. 16. In the less proportional breadth and greater length of the *sacrum*. 17. In the less proportional breadth of the *ilium*, and greater expansion of the *ischium*. 18. In the comparative shortness of the upper extremities, more especially of the fore-arm and hand. 19. In the non-division of the pisiform bone of the wrist. 20. In the greater proportional length of the *femur* and *tibia*, and the less proportional length of the foot. 21. In the presence of a *ligamentum teres*, and consequent depression in the head of the *femur*. 22. In the greater proportional size of the *tarsus* as compared with the *phalanges* of the toes. 23. In having constantly two *phalanges* in the *hallux* or great toe with a nail, while the ungueal *phalanx* and nail are often wanting in the *hallux* of the orang, especially in that of the female.

The *Chimpanzee* approximates more nearly to the human structure in those deviations which are numbered 4, 5, 6, 7, 8, 9, 10, 12, 13, 17, 18, 19, 20, 21, 22, 23.

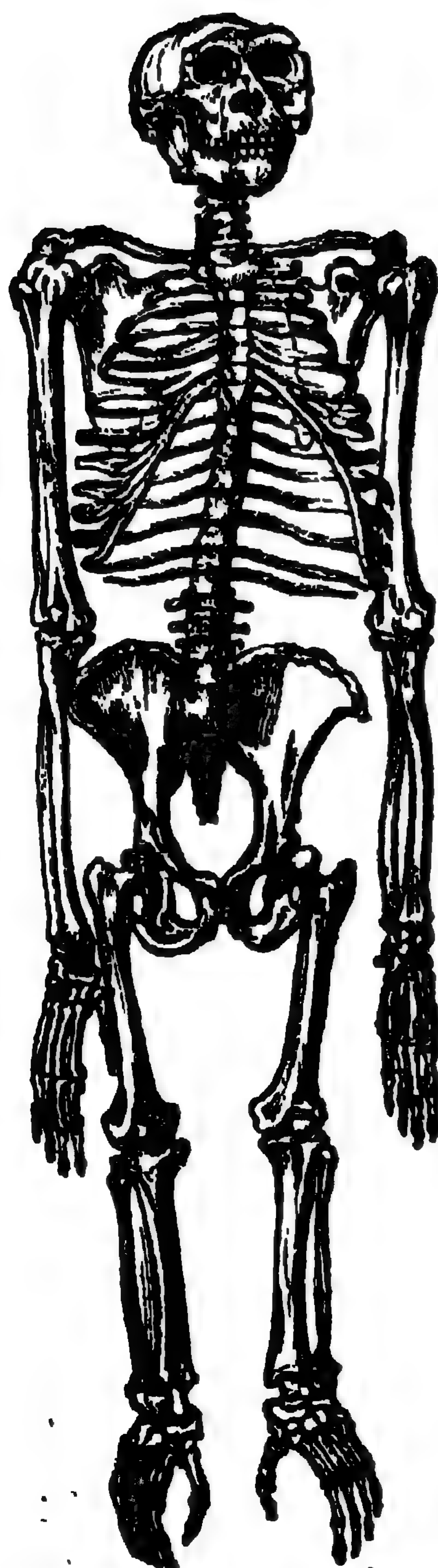
The *Orang* has a nearer resemblance to *Man*: 1. In the junction of the sphenoid with the parietal bones. 2. In having 12 pairs of ribs. 3. In the form of the *scapula*, especially in its greater breadth.

Mr. Owen well observes, that it is a result of the preceding comparison, that the *Chimpanzee* ought to rank above the *Orang* in a descending series, and not below it as in the *Règne Animal* of Cuvier. Linnæus, as we have seen, gave the *Chimpanzee* that superiority of rank, but erred as much on the other side by placing it under the genus *Homo*, for both the *Chimpanzee* and *Orang*, according to Owen, differ in structure from the human subject. 1. In the *diastema*, or interval between the *cuspidati* and incisors in the upper jaw, and between the *cuspidati* and *bicuspides* of the lower jaw. 2. In the greater magnitude of the intermaxillary bones, indicated in the adult by the distance of the *foramina incisiva* from the incisive teeth, both of which differences result from the greater proportional development and different forms of the *cuspidati* and incisors. These, as the author observes, are differences of generic value. 3. In the more backward position and oblique plane of the occipital *foramen*. 4. In the smaller proportional size of the occipital condyles. 5. In the larger proportional size of the petrous bones. 6. In the greater proportional development of the jaws. 7. In the flatness of the nasal bone, which is rarely divided in the mesial line, while in *Man* the nasal bones are as rarely consolidated into one. 8. In the presence of the ant-auditory process of the temporal bone, and the absence of the mastoid and styloid processes. 9. In the absence of the process of the ethmoid, called *crista galli*. 10. In the shortness and comparative weakness of the lumbar region of the spinal column, which is also composed of four instead of five *vertebræ*. 11. In the narrowness and proportional length of the *sacrum*. 12. In the flatness of the *ilia*, and the larger development and outward curvature of the *ischia*. 13. In the position of the *pelvis* in relation to the spine. 14. In the larger proportional development of the chest. 15. In the greater length of the upper extremities. 16. In the wider interval between the *ulna* and *radius*. 17. In the shortness and weakness of the thumb, and narrowness of the hand in relation to its length. 18. In the shortness of the lower extremities. 19. In the greater proportional length and narrowness of the foot. 20. In the small size of the *os calcis*. 21. In the shortness and opposable condition of the *hallux*.

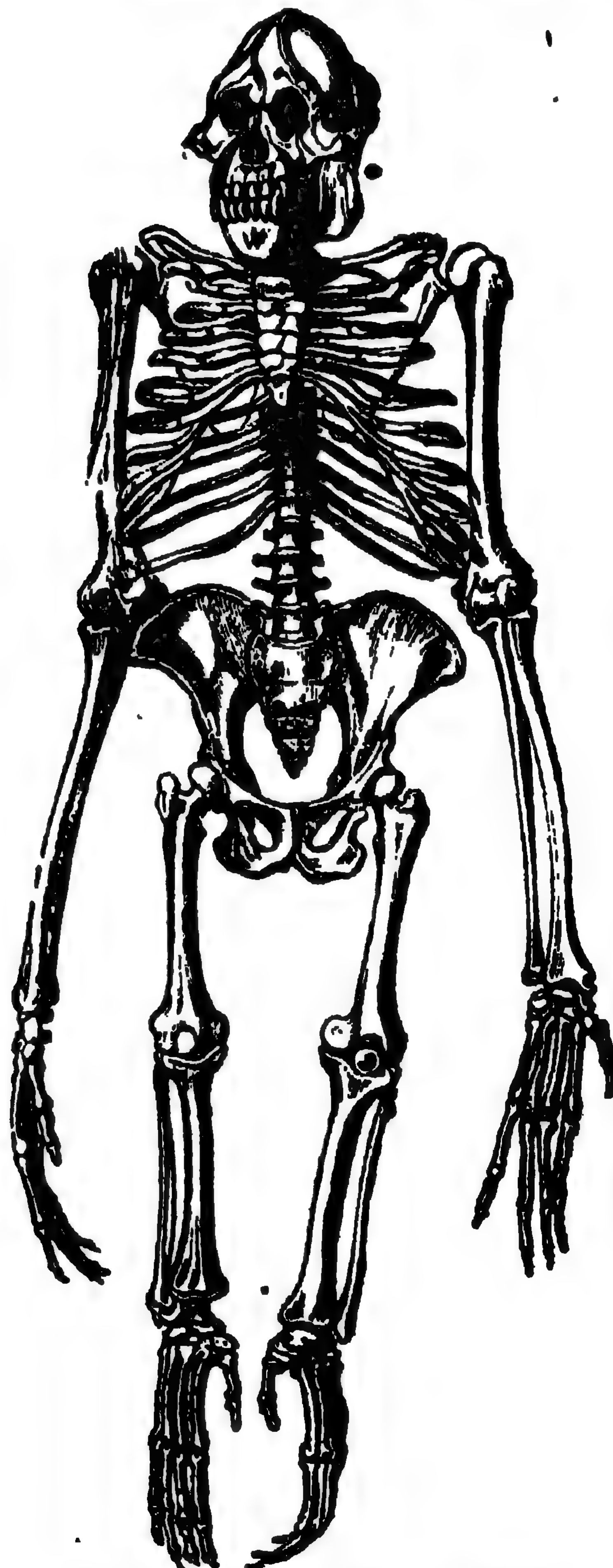
'These differences,' adds Mr. Owen, 'result from original formation, and are not liable to be weakened in any material degree, either on the one hand by a degradation of the human species, or, on the other hand, by the highest cultivation of which the anthropoïd *apes* are susceptible.'



[Skeleton of Man.]



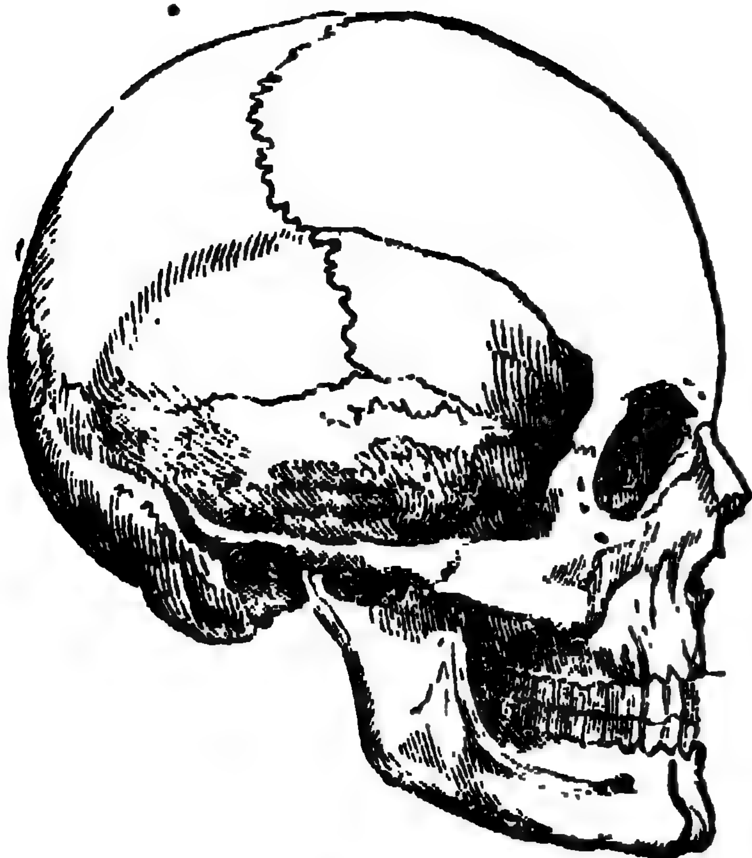
[Skeleton of Chimpansee, from Owen.]



[Skeleton of Orang Utan, from Owen.]

In following out this osteological comparison it becomes necessary, for the assistance of the student, to give a sketch of the cranial development in man, and in the anthropoïd

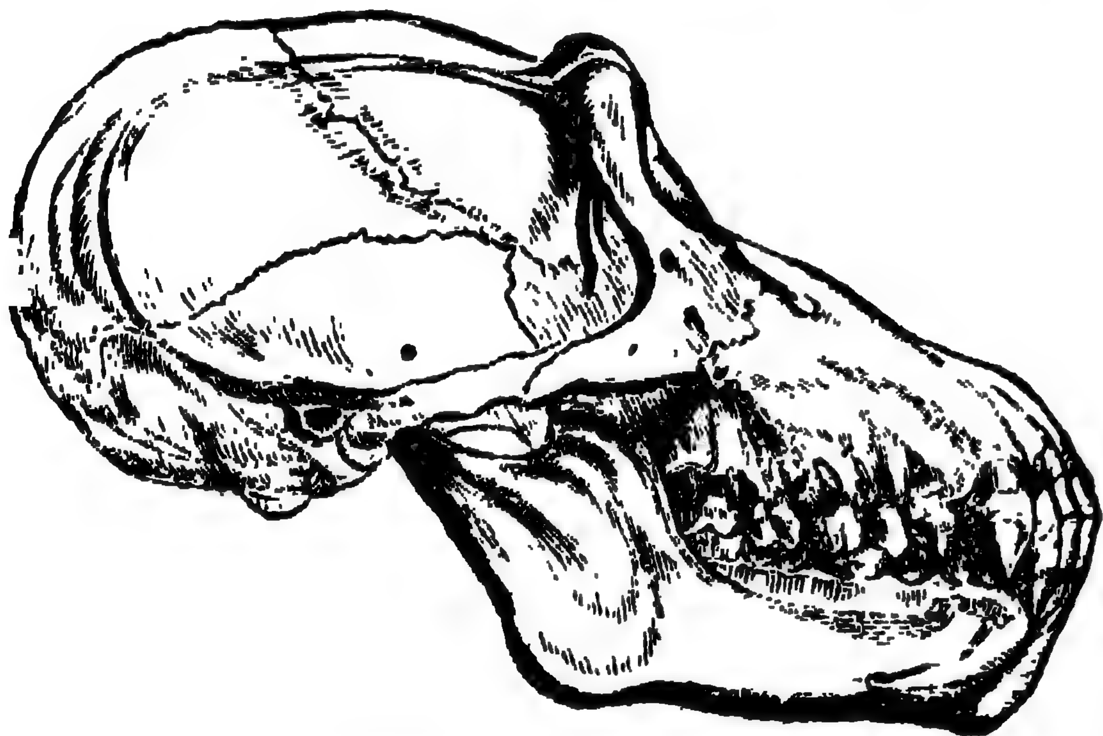
apes, so that he may have under his eye the comparative form of each.



[Well-developed Human Skull.]



[Skull of Human Idiot, from Owen.]



[Skull of Chimpanzee, from Owen.]



[Skull of Orang Utan, from Owen.]

The following summing-up is so much better than anything we could present to the reader, that we give it in Mr. Owen's words.

'Certain modifications in the form of the human *pelvis* have been observed to accompany the different forms of the *cranium* which characterize the different races of mankind; but there is nothing in the form of the *pelvis* of the Australian or Negro which tends to diminish the wide hiatus that separates the *bimanous* from the *quadrumanous* type of structure in regard to this part of the skeleton. Observation has not yet shown that the *pelvis* of the *Orang*, in a state of captivity, undergoes any change approximating it towards the peculiar form which the same part presents in the human subject. The idea that the iliac bones would become expanded and curved forwards, from the pressure of the superincumbent *viscera*, consequent on habitual attempts at progression on the lower extremities, is merely speculative. Those features of the *cranium* of the *Orangs* which stamp the character of the irrational brute most strongly upon their frame, are, however, of a kind, and the result of a law originally impressed upon the species, which cannot be supposed to be modified under any circumstances, or during any lapse of time; for what external influence operating upon and around the animal can possibly modify in its offspring the forms, or alter the size, of the deeply-seated germs of the permanent teeth? They exist before the animal is born; and let him improve his thinking faculties as he may, they must, in obedience to an irresistible law, pass through the phases of their development, and induce those remarkable changes in the maxillary portion of the skull which give to the adult *Orangs* a more bestial form and expression of head than many of the inferior *simiæ* present. It is true that in the human subject the *cranium* varies in its relative proportions to the face in different tribes, according to the degree of civilization and cerebral development which they attain; and that in the more debased Æthiopian varieties, and Papuans, the skull makes some approximation to the *quadrumanous* proportions: but in these cases, as well as when the *cranium* is distorted by artificial means or by congenital malformation, it is always accompanied by a form of the jaws, and by a disposition and proportions of the teeth, which afford unfailing and impassable generic distinctions between *Man* and the *Ape*. To place this proposition in the most unexceptionable light, I have selected the *cranium* of a human idiot, in whom nature may be said to have performed for us the experiment of arresting the development of the brain almost exactly at the size which it attains in the *Chimpanzee*, and where the intellectual faculties were scarcely more developed; yet no anatomist would hesitate in at once referring this *cranium* to the human species. A detailed comparison with the *cranium* of the *Chimpanzee* or *Orang* shows that all those characters are *retained* in the idiot's skull which constitute the differential features of the human structure. The cranial cavity extends downwards below the level of the glenoid articulatory surfaces. The nasal bones are two in number, and prominent. The jaws and teeth exhibit the *bimanous* characters as strongly as in the most elevated of the human race. The *cuspidati* do not project beyond the contiguous teeth, and consequently there are no interruptions in the dental series, as in the *Orangs*, where they are required to lodge the disproportionate crowns of the canine teeth.'

M. Geoffroy St. Hilaire characterized the subgenus *Troglodytes* from immature *Chimpanzees;* and as Mr. Owen's observations were made upon the skeleton of an adult individual, and he has consequently altered the zoological characters given by Geoffroy, we follow Mr. Owen's definition.

Subgenus Troglodytes.

Dental formula, the same as in the human subject; viz., incisors $\frac{4}{4}$, canines $\frac{2}{2}$, bicuspids $\frac{4}{4}$, molars $\frac{6}{6}$. (N.B. The teeth approximate in their proportionate size much more nearly than those of the Orang to the human teeth; but they manifest in their relative position the absence of the character, which, with one anomalous exception—that of the fossil genus *anoplotherium*—is peculiar, among mammifers, to man; viz., unbroken proximity.)

Muzzle long, truncated anteriorly; strong supraciliary ridges, behind which the forehead recedes directly backwards; no cranial ridges.

Facial angle 35°, excluding the supraciliary ridges

Auricles, large.

Thirteen pairs of *ribs*; bones of the sternum in a single row.

Arms reaching below the knee-joint.

Feet wide; hallux extending to the second joint of the adjoining toe.

Canines large, overpassing each other; the *apices* lodged in intervals of the opposite teeth.

Intermaxillary bones anchylosed to the maxillaries during the first or deciduous dentition.

Example. The *Chimpanzee*, *Black Orang*, or *Pygmy* (*Troglodytes niger* of Geoffroy, *Simia Troglodytes* of Blumenbach). In the young state the animal has been named *Jocko*.

Description. The following is from the pen of Dr. Traill, of Liverpool: and from minute examination of the individual lately exhibited at the garden of the Zoological Society, in the Regent's Park, London, we can vouch for its accuracy. Dr. Traill's specimen was a young female, about thirty inches high, and was brought home by Captain Payne. 'The skin appears of a yellowish-white colour, and is thinly covered with long black hair on the front; but it is considerably more hairy behind. The hair on the head is rather thin, and is thickest on the forehead, where it divides about an inch above the orbital process of the frontal bone, and, running a little backwards, falls down before the ears, forming whiskers on the cheeks. Here the hair measures nearly two inches long; but that on the occiput is not above an inch in length. There are a few stiff black hairs on the eyebrows, and a scanty eyelash. A few whitish hairs are scattered on the lips, especially on the under one. The rest of the face is naked, and has whitish and wrinkled skin. There is scarcely any hair on the neck, but, commencing at the nape, it becomes somewhat bushy on the back. The abdomen is nearly naked. The hair on the back of the head, and the whole trunk, front of the lower extremities, back of the legs, and upper part of the superior extremities, is directed downwards, while that on the back of the thigh and fore arms is pointed upwards, appearances well represented in Tyson's figure. The longest hair is just at the elbows. There is none on the fingers or palms of either extremity. The ears are remarkably prominent, thin and naked, bearing a considerable resemblance in shape to the human, though broader at the top. The projection of the process above the eyes is very conspicuous, but has not been sufficiently marked in any engraving or drawing which has fallen under my observation. The nose is quite flat, or rather appears only as a wrinkle of the skin, with a slight depression along its centre. The nostrils are patulous, and open upwards, which would be inconvenient did the animal usually assume the erect posture. The projection of the jaws is excessive, and though much less so than in the baboon, yet the profile of the face is concave. It may be remarked however that the projection of the lower jaw is caricatured in the first and second figures of Camper's second plate. The mouth is wide, the lips rather thin, and destitute of that recurvation of the edges which adds so much to the expression of the human countenance. The spread of the shoulders is distinctly marked, but the width of the lower part of the chest is proportionally greater, when compared to the upper, than in man. From the lower ribs the diameter of the abdomen decreases rapidly to the loins, where the animal is peculiarly slender; a circumstance in which it approaches the other *Simiæ*. The pelvis appears long and narrow, another approximation to the rest of the genus. With regard to the limbs, the chief difference between our specimen and Dr. Tyson's figure consists in the excessive length of the arms, which in this animal descend below the knees, by the whole length of the phalanges of the fingers, which are above three inches in length. The same observation applies to almost every figure of this animal which I have seen. The proportions in the work of Camper approach nearest, in the present instance, in this particular. The hand differs from the human in having the thumb by far the smallest of the fingers. The foot is more properly a hand appended to a tarsus. The thumb of this extremity is very long, powerful, and capable of great extension. The legs are certainly furnished with calves; but they scarcely resemble the human in form, because they are continued of equal thickness nearly to the heel. When this animal is erect, the knees appear considerably bent, as is the case with the other *Simiæ*, and it stands with the limbs more apart than man.'

Geographical distribution. Africa is the only part of the world known to be the residence of the Chimpanzee, which, it should be remembered, has been confirmed, as Cuvier observes, by almost all zoologists. The specimen described by Dr. Traill was procured in the isle of Princes, in the gulf of Guinea, from a native trader, who had carried it thither from the banks of the Gaboon. The individual exhibited in the Egyptian Hall, Piccadilly, in 1831, had been obtained by a trading vessel on the river Gambia, and that exhibited at the garden of the Zoological Society was brought from the Gambia coast. Cuvier gives Guinea and Congo as its localities. The subject of Mr. Owen's paper was shot by a European at Sierra Leone.

Habits. The habits of the Chimpanzee in a state of nature are but imperfectly known. Cuvier states that the Chimpanzees live in troops, construct themselves huts of leaves, arm themselves with sticks and stones, and employ these weapons to drive man and the elephant from their dwellings. He also repeats the story of their pursuit of the negresses and carrying them off into the woods. This report is, as we shall presently see, still credited in the country where they are found. Speaking of Captain Payne, Dr Traill, in his interesting paper in the Wernerian Transactions, says, 'The natives of Gaboon informed him that this species attains the height of five or six feet; that it is a formidable antagonist to the elephant; and that several of them will not scruple to attack the lion and other beasts of prey, with clubs and stones. It is dangerous for solitary individuals to travel through the woods haunted by the orang, and instances were related to Captain Payne of negro girls being carried off by this animal, who have sometimes escaped to human society after having been for years detained by their ravishers in a frightful captivity. These reports confirm the narratives of the early voyagers, who have often been suspected of exaggeration, and similar facts have been recently stated, very circumstantially, by gentlemen who have lived in western Africa.'

In a state of captivity its manners have been the theme of many a tale, and much admiration; and as most of the individuals described have died very young, conjecture has been busy as to the progress the animal might make if its education were continued to the adult state. 'Deductions,' says Mr. Owen in his paper above referred to, 'in favour of the anthropomorphous character of the orangs have been derived from observation of the living habits of young orangs; but these cannot be regarded as affording a type of the nature of the adults, since it is well known that the docility and gentle manners of the young ape rapidly give way to an unteachable obstinacy and untameable ferocity in the adult; at least of those species to which, as I shall afterwards show, the full-grown orangs have the nearest resemblance in the form of the head.'

Captain Payne thus describes the manners of the animal which formed the subject of Dr. Traill's paper. 'When our animal came on board,' says Captain Payne, 'it shook hands with some of the sailors, but refused its hand, with marks of anger, to others, without any apparent cause. It speedily however became familiar with the crew, except one boy, to whom it never was reconciled. When the seamen's mess was brought on deck, it was a constant attendant; would go round and embrace each person, while it uttered loud yells, and then seat itself among them to share the repast.' It sometimes expressed its anger by a barking noise like a dog; at others it would cry like a froward child and scratch itself most vehemently. When any favourite morsel was given to it, sweetmeats more especially, it expressed its satisfaction by a sound like 'hem,' in a grave tone. The variety of its tones seems to have been small. It was active and cheerful in warm latitudes, but languor came on as it left the torrid zone; and on approaching our shores, it manifested a desire for a warm covering, and would roll itself carefully up in a blanket when it went to rest. It generally progressed on all fours, and Captain Payne particularly observed that it never placed the palms of the hands of its anterior extremities on the ground, but, closing its fists, rested on the knuckles. This mode of progression noticed by Tyson was confirmed to Dr. Traill by a young naval officer who had been for a considerable time employed in the rivers of western Africa, and had opportunities of observing the habits of this species. Captain Payne's animal did not seem fond of the erect posture, which it rarely affected, though it could run nimbly on two feet for a short distance. In this case it appeared to aid the motion of its legs by grasping the thighs with its

hands. It had great strength in the four fingers of its superior extremity; for it would often swing by them on a rope upwards of an hour without intermission. When first procured, it was so thickly covered with hair, that the skin of the trunk and limbs was scarcely visible, until the long black hair was blown aside. It ate readily every sort of vegetable food; but at first did not appear to relish flesh, though it seemed to have pleasure in sucking the leg-bone of a fowl. At that time it did not relish wine, but afterwards seemed to like it, though it never could endure ardent spirits. It once stole a bottle of wine, which it uncorked with its teeth, and began to drink. It showed a predilection for coffee; and was immoderately fond of sweet articles of food. It learned to feed itself with a spoon, to drink out of a glass, and showed a general disposition to imitate the actions of men. It was attracted by bright metals, seemed to take a pride in clothing, and often put a cocked hat on its head. It was dirty in its habits, and never was known to wash itself. It was afraid of fire-arms; and on the whole appeared a timid animal. It lived with Captain Payne seventeen weeks, two of which were spent in Cork and Liverpool. At the former place it was exhibited for the benefit of the soup-kitchen for a few days, but seems to have been there neglected. On coming to Liverpool it languished a few days, moaned heavily, was oppressed in its breathing, and died with convulsive motions of the limbs. Such is Dr. Traill's account.

We also refer to the observations on the habits, &c., of a male chimpanzee (*Troglodytes niger*, Geoff.), then living in the menagerie of the Zoological Society of London, by Mr. Broderip, which were read at a meeting on the 27th of October, 1835 *.

The animal that was the subject of Mr. Broderip's remarks died in the spring of the following year; and on the 12th of April, 1836, Mr. Owen detailed the morbid appearances observed on its dissection *



[Troglodytes niger.]

Before we conclude this article, it may be necessary to hint at the probable height of the adult chimpanzee. The natives of Gaboon, as we have seen, informed Captain Payne that the species attained the height of five or six feet. Bingley, in his 'Animal Biography,' says, 'Allemand, the Dutch professor of natural history, had received many vague and unsatisfactory accounts respecting an animal of this kind, and was induced to write to Mr. May, a captain in the Dutch naval service stationed at Surinam. This gentleman found him exactly similar to one which he had brought from Guinea, except in size. He was nearly five feet and a half high, and very strong and powerful. Mr. May had seen him take up his master, a stout man, by the middle, and fling him from him for a pace or two; and one day he seized a soldier, who happened to pass carelessly near the tree to which he was chained, and, if his master had not been present, he would actually have carried the man into the tree.' It is further stated that the age of this animal, when Mr. May saw it, was about twenty-one years. In the following year it died, but was said to have increased in height during the interval. The mother of that exhibited in the menagerie of the Zoological Society was reported to have stood four feet six inches in height: but Mr. Owen gives three feet ten inches as the length of the body in the adult chimpanzee (skeleton), from the *vertex* to the base of the *os calcis*, and four feet as the height of the adult at the end of his subgeneric character.

* Proceedings of the Zoological Society of London, 1835, 1836.

CHINA is an extensive country in Eastern Asia, constituting the principal portion of the Chinese empire. It is situated on the borders of the Pacific, and extends from 20° N. lat., or, if the island of Hainan is included, from 18° to 41° N. lat., and if the tract of land projecting on the north-west towards the centre of Asia be added, to 46° N. lat. Its eastern extremity, where it borders on Corea, is cut by 124° E. long., and its western, where it borders on the Birman empire, by 98° E. long.; but if the projecting tract be added, it reaches to 85° E. long. Its greatest length, from the harbour of Amoy, opposite the island of Formosa, taken in a north-western direction to the farthest extremity of the projecting tract, can hardly fall short of 2000 miles. If, however, this latter tract is excluded, the length of China from the Peninsula opposite the island of Hainan to the great wall due north of Peking is about 1400 miles: its breadth varies between 900 and 1300 miles. If its average length is taken at 17 degrees of lat., or about 1180 miles, and its average breadth at the same number of miles, the area of China is 1,292,400 square miles, a computation which does not differ much from that of Sir George Staunton, who assigns to it 1,297,999 square miles, or an area more than eleven times as large as that of the British Islands. The north-western projecting tract is not included in both calculations.

China is surrounded by countries dependent upon it, except at its south-western and southern side, where it borders on the Birman empire, the kingdom of Siam, and that of Cochin China, of which the last only seems to be nominally dependent on China. On the west of it extend Tibet and the country of Kho-kho-nor, or Ching-Hai. The projecting tract is mostly surrounded by Eastern Turkistan, lately called Grand Tartaria, and by Mongolia. Mongolia occupies also the greatest part of its northern boundary, except in the extreme east, where it is bounded by Manchuria or Ching-King and by Corea. Its eastern side is washed by the Pacific, which forms a deep gulf between China and Corea, called the Hoango-Hai or Yellow Sea; it assumes the name of Tung-Hai or Eastern Sea, between Corea and the island of Formosa, and that of Nan-Hay or Southern Sea, between Formosa and Hainan.

Its coast being about 2440 miles, there is only one mile of coast for every 532 square miles. Where China borders on Corea its coast is high and bold, and full of rocky islets. This coast continues on both sides of the Peninsula of Leao-tung, or about 240 miles. It is followed by a sandy coast, which in most places is so low that it cannot be seen at a short distance from the shore: this coast extends from the innermost corner of the bay of Leao-tung for about 360 miles to the neighbourhood of the Straits of Meao-toa, which form the entrance of the bay of Pe-tsche-li. The coast of the Peninsula of Chan-tung is rocky, and commonly bold, but not high, except in a few places. It extends from the Straits of Meao-toa to Cape Macartney, and hence to 35° N. lat., about 350 miles. The shores, as far as the Chusan Islands (30° 30′ N. lat.), are low and sandy, indeed in many places very swampy, and extend from 420 to 450 miles. From the Chusan Islands to the bay of Canton the coast is rocky, bold, and high, except in the recesses of the numerous bays and harbours. At some places it rises to a considerable height, and is besides lined with numerous cliffs and rocky islets, in all its extent of about 800 miles. The western shores of the bay of Canton, for about 30 miles, are formed by a great number of low sandy islands. From the bay of Can-

ton to the peninsula of Lui-cheou, about 120 miles, the coast is again rocky and bold, but it does not appear to be high. The shores of the peninsula itself are about 100 miles long, sandy, flat, and low; the remainder of the coast of China, which is washed by the Gulf of Tonkin (about 100 miles), is not well known.

A considerable portion of China is covered with mountains. Its western boundary extends to the chains which constitute the eastern edge of the high table-land of Eastern Asia [ASIA AND BAYAN KHARA]; but only the most eastern of these ranges lies within the boundary of China. It may be considered as beginning in the most southern bend of the Yang-tse-kiang, between 101° and 103° E. long., and as extending hence in a N.N.E. direction, and terminating in the great northern bend of the Hoang-ho, between 107° and 111° E. long. This mountain-range, which is called Siue-ling (Snow-range), or Yung-ling, contains a considerable number of snow-capped summits. The snowy mountains are numerous between 30° and 36° N. lat., and more especially between 32° and 34°. But even south of the great southern bend of the Yang-tse-kiang, and at a short distance from its banks, are some snow-covered summits, whence Ritter rightly concludes, that the river breaks through the southern portion of the range. The four mountain-chains, which traverse China from west to east, may be considered as offsets of this range. South of the snowy mountains, which are situated on the south of the great bend of the Yang-tse-kiang, is the hilly table-land of Yunnan. It is of considerable extent, and at a great elevation above the sea, if we may judge from its temperature in summer. From the eastern edge of this table-land two mountain-ranges branch off, the Yu-ling and the Nan-ling. The Yu-ling, the most southern of these ranges, branches off from the table-land in 24° N. lat. and 102° E. long., and runs nearly east to the neighbourhood of the bay of Canton, dividing the river Ta Si-kiang from the sea. It does not seem to approach the shores of the sea in any point, nor to rise to a great height. The Nan-ling (or southern range) which constitutes the most extensive mountain-system in China, branches off from the northern edge of the table-land of Yun-nan, where the snowy mountains are situated (26° N. lat. and 103° E. long.), and runs eastwards, passing about 150 miles to the north of Canton as far as 116° E. long.; it then inclines to the north-east, in which direction it continues with a slight bend to the west to its termination on the sea near the harbour of Ning-po, opposite the islands of Chusan. Several summits of this range rise above the snow-line, west of 110° E. long., where also it extends to a great width. An aboriginal nation, the Mioa-tsee, have maintained their independence in its fastnesses. A lateral range, which separates the Yang-tse-kiang from its tributary the Yuen-kiang, and extends north-east to the centre of China, is also said to contain some summits which rise above the snow-line. East of 110° no snow-capped mountains occur, though some rise to a great elevation; but even here the range preserves its steep and rugged character. Its numerous branches, running towards the Formosa Strait and the Tung-Hai, are also steep and craggy, but those extending northward are of inconsiderable elevation. Three mountain-passes are known to traverse the Nan-ling. The most frequented is to the north of Canton, where the range is called Mei-ling (the chain of the wild plum-trees, according to Klaproth), and hence the pass is called Mei-ling pass. By this pass goods are transported from Canton into the interior of China. Goods are brought in boats on the river Pe-kiang to the town of Nan-yong-foo. Between this town and that of Nan-gan-foo is the pass where goods are carried on the backs of men, for about 24 miles over rocky mountains. This is the only place, between Canton and Peking, where no water communication exists; for at Nan-gan-foo the goods are again shipped and descend the Kan-kiang and afterwards the Yang-tse-kiang till they come to the great canal. The elevation of the Mei-ling mountain-pass is estimated by Staunton to be 8000 feet above the sea. The second pass which is known occurs near 28° N. lat. and 118° E. long. between Kien-ning-foo on the east and Kian-tchang-foo on the west of the range, and though the mountains are very steep and rugged it is much frequented; 18,000 porters are continually employed for the transport of goods. The third road, which is a little farther north, connects the town of Kien-ning-foo with the town of Kin-tcheou-foo, which lies on the west of the range. Though difficult to pass it is much used.

The two other mountain-ranges, the Tapa-ling and the Pe-ling, are immediately connected with the Yun-ling, the Tapa-ling branching off south of 33° N. lat. and Pe-ling about 35°. The Tapa-ling runs south of east nearly in a straight line, and terminates near 112° E. long. north-east of the town of Koei-tcheou-foo. It divides the valley of the Han-kiang from that of the Yang-tse-kiang, and rises to a great height; several of its summits exceed the snow-line, as, for instance, the Kianku Shan, with which it terminates. The Pe-ling, which runs nearly parallel to the Tapa-ling, separates the valley of the Han-kiang from that of the Hoai-ho, or Wei-ho, an affluent of the Hoang-ho, and consequently the two great river-systems of China from one another. It continues in its eastern direction to 113° E. long., and this portion of the range is high, rugged, and steep. At 113° it declines to the south-east, diminishing considerably in elevation and ruggedness. Having attained 32° N. lat. it turns again to the east, and soon subsides into a chain of hills, which terminates on the western shores of the lake Tsiao-hoo, a considerable distance east of Nanking. The western part this range contains several snowy mountains, though fewer than the Tapa-ling. The obstacles opposed by these two chains to the communication between the provinces which they traverse have been overcome by an artificial road, much more extensive than those which traverse the Alps. Beginning at the antient capital of Si-ngan-foo on the banks of the Hoai-ho it runs in the valley of that river west past Fong-tsiang-foo to a place named Pao-ki-hiang. Near this place begins the mountain-road which is conducted over deep clefts by long bridges, and is often deep cut through high mountains. It then descends from the Pe-ling to the valley of the Han-kaing, which it crosses about 20 miles west of the town of Hang-tchong-foo. It then traverses the Tapa-ling, on the south of which it terminates on one of the branches of the Kialing-kiang at Tchao-hoa, north of Kian-tcheou-foo. This artificial mountain-road is said to be 420 lis or nearly 150 miles long. Its continuation leads through a less mountainous country, traverses the town of Poa-king-foo, and terminates at the antient capital of Tching-tu-foo.

These ranges traverse that part of China which lies south of the Hoang-ho. But even the western, and greater portion of the countries north of that river is almost entirely covered with high and rugged mountains. These mountains belong partly to the northern portion of the Yun-ling, which joins the Hoang-ho at its great bend, and partly are ramifications of the Inshan, a range which extends round the bend of the river on the west and north, and whose offsets enter China between that bend and the town of Peking in several ridges.

The whole surface of China may be divided into the mountainous country, the hilly country, and the great plain. The mountainous country comprehends more than half of the whole, and the meridian of 112° may be considered its eastern boundary, but to the north of the Hoang-ho it extends as far as 114°. All this immense tract of country is covered by mountains and valleys. The mountains are commonly too steep and rugged to admit much cultivation, but a great part of them is covered with high trees. Towards the north they are mostly bare, but contain immense beds of coal. The valleys are often narrow, but being watered by numerous streams, their fertile soil maintains a numerous population. This general description, however, applies properly, in all its extent, only to the districts north of the Tapa-ling and south of the Nan-ling, for in those between these two ranges the mountains are less steep, and their sides are commonly cultivated to a considerable height. The valleys, too, are much wider, and the level land sometimes extends to plains of considerable width, as, for instance, the plain of Tching-tu-foo, which is perhaps 20 miles in every direction.

Among the mountainous districts must be included the tract of land which lies between the Nan-ling and the sea; but, with the exception of the immediate neighbourhood of the range, it rather resembles the countries between the Nan-ling and Tapa-ling than those farther north, its valleys being generally wide, and sometimes expanding into plains, as, for instance, the plain of Canton. A considerable portion of the sides of the mountains is also fit for cultivation. If this tract is added to the other mountainous country, it may be said, that rather more than two-thirds of the surface of China are of this character.

The hilly country lies to the east of 112° E. long., and

between this meridian and the eastern part of the Nan-ling, and extends north to the banks of the Yang-tse-kiang. The hills, though in many places steep, generally rise with a gentle ascent; and, as they do not attain a great elevation, their sides are cultivated, and planted with rice on the terrace system. Their tops are covered with forest trees, generally of the pine kind, which are carefully planted. The levels between the hills are sometimes narrowed into valleys, in other places they expand into plains. They have generally abundance of water in their rivers, and there are some lakes, of which the largest are the Tung-ting near the confluence of the Yuen-kiang with the Yang-tse-kiang, and the Po-yang, not far from the mouth of the Kan-kiang. The greatest portion of the surface is in a very high state of cultivation.

The great plain occupies the north-eastern part of China. It extends in length 700 miles from the Great Wall, north of Peking, to the confluence of the rivers Yang-tse-kiang and Kan-kiang (30° N. lat.). The Yang-tse-kiang may be considered as its southern boundary, as far down as Ngan-king, whence to the sea it is formed by a line drawn from Ngan-king to the sea, through Hang-tcheou-foo. The western boundary-line may be marked by a line drawn from King-tcheou-foo, a town situated on the Yang-tse-kiang, to Hoai-king-foo, on the Hoang-ho, and hence to the Great Wall, about 50 miles north-west of Peking. The breadth of the plain is various. North of 35° N. lat., where it partly extends to the shores of the Hoang-hai, and partly borders on the western side of the mountain range of Chang-tung, which occupies the peninsula of that name, its width varies between 150 and 250 miles. If we suppose the average breadth to be 200 miles, this portion of the plain covers an area of 70,000 square miles. Between 35° and 34' N. lat. the plain enlarges, and in the parallel of the Hoang-ho it extends more than 300 miles east and west. It grows still wider to the south, and reaches nearly 500 miles inland in the parallel of the embouchure of the Yang-tse-kiang. If we suppose the mean breadth of this portion of the plain to be 400 miles, it occupies a surface of 140,000 square miles. The whole plain, containing 210,000 square miles, is seven times as large as that of Lombardy, with which it may be compared in many respects.

The northern part of the plain has a dry sandy soil, impregnated in many parts with saline matter, and destitute of trees, but it produces millet and wheat in abundance. South of 35° N. lat. the whole tract along the coast is very low and swampy, being partly covered with numerous lakes and lagunes, and intersected by numerous water-courses, both artificial and natural. It produces a great quantity of rice. Farther inland the soil is more firm and dry, and of great fertility, which is increased by the abundance of water drawn from the rivers and small lakes. It produces rice, cotton, wheat, and tobacco. The southern districts bordering on the banks of the Yang-tse-kiang differ from the other in not being a flat level, but having a surface slightly undulating, on which even a range of hills rises, as the eastern prolongation of the Pe-ling. It is not, however, less fertile than the other districts. Among its most valuable branches of agriculture is tea, which is extensively cultivated on these low hills (between 30° and 32° N. lat.)

The eastern portion of this plain is traversed by the Great or Imperial Canal, which begins on the south at the town of Hang-tcheou-foo (30° N. lat.), and extends to the town of Lin-tchin-cheou, where it falls into the river Eu-ho or Wei-ho. Its length considerably exceeds 500 miles in a straight line, and probably its whole length may be 700. Some portions of it have been made merely for the purpose of internal navigation, but in others the design of draining and irrigating the adjacent country has been connected with it; hence it differs widely from all the canals made in Europe. Its breadth is considerably greater, and its waters are in few places altogether without a current. At a few points it is cut through rocks; it often traverses lakes and swamps of considerable extent, running on an artificial elevation, sometimes 20 feet above the surface of the country. Its flood-gates, bridges, the vessels which navigate it, and the number of towns and villages lining its banks, excite the admiration of all travellers. By this canal, and the navigable rivers, Yang-tse-kiang and Kan-kiang on the south, and the rivers Eu-ho and Pei-ho in the north, goods may be transported by water from the foot of the Mei-king pass to the town of Tong-tcheou-foo, a few miles distant from Peking. That portion of the canal which lies south of the Hoang-ho was made in the seventh century, or soon after, but the more northern part in the thirteenth, by Kublai Khan and his successors, when the Tartar dynasty had removed the imperial residence from Nanking to Peking.

The fertility of its soil and the advantages resulting from the internal navigation afforded by the Great Canal and its numerous branches, have rendered this plain the most populous spot on the earth. According to the census of 1813, the provinces which it comprises contained a population of 177 millions, namely, Pe-tshe-li 28, Chantung 29, Honan 23, An-hoei, or Ngan-hoi, 34, Kiang-su 37, and Che-kiang 26. Here then, as Ritter observes, lives a population more than two-thirds of the whole population of Europe. To protect this rich plain the Great Wall was erected, which incloses China on the northern boundary, and extends over mountains and rivers for about 1400 miles. This great work was constructed rather more than 2000 years since, or about 200 years before the Christian æra, by the first universal monarch of China, as a defence against the nomadic tribes of Tartars, who have never ceased to infest the country to the south, as long as it has been subject to a separate dominion. The main substance of the wall is earth or rubbish, retained on each side by a thick casing of stone and brick, and terraced by a platform of square tiles. It bounds the whole north of China, extending along the frontiers of three provinces, a distance of nearly 19° of longitude. From its eastern extremity there is an extensive stockade of wooden piles, enclosing the country of Mougden, and which in some European maps has been erroneously represented as a continuation of the solid barrier. The total height of the wall, as observed by an engineer officer in Lord Macartney's embassy, is 20 feet, on a basis of stone projecting 2 feet under the brick-work, and about the same in height. The thickness of the whole wall at the base is 25 feet, diminishing to 23 at the platform. The towers are 40 feet square at the base, diminishing to 30 at the top, and about 37 feet in height. The thinness of the parapet of the wall, being only 18 inches, justifies the conclusion that it was not intended to resist cannon; and it appears certain that the use of fire-arms is comparatively modern in China, however antient the invention of gunpowder.

Numerous rivers drain and water China, but by far the greater number flow into the HOANG-HO and YANG-TSE-KIANG, which are among the greatest rivers of the globe. Among the rivers which do not belong to the systems of those two great rivers, two require notice here, the Pei-ho and the Ta-si-kiang. The Pei-ho or White River rises on the mountains north-west of Peking, near the Great Wall, and flows in a south-eastern direction to the town of Tong-tcheou-foo, a few miles east of Peking, where it becomes navigable for large river-boats. Continuing in the same direction, it unites with the Eu-ho, a much larger river than the Pei-ho itself, which rises near the banks of the Hoang-ho, and running in a north-east direction is connected with the Great Canal at the town of Lin-tchin-tcheou: the remainder of its course may be considered as the continuation of the canal. The tides come up nearly to the place where the Eu-ho meets the Pei-ho, a distance of more than eighty miles. Hence to the sea the Pei-ho runs nearly due east, and at its mouth has a bar which at low tides has only two or three feet water upon it; but at high tides, which here rise five or six feet, the bar does not prevent the flat-bottomed Chinese junks from entering the river. There is perhaps no river in the world which is navigated by so many vessels as the Pei-ho.

The Ta-si-kiang, or the river of Canton, rises east of the town of Yunnan (103° E. long.), and runs the first half of its course in a narrow valley between high mountains, and the other half in a wide, fertile, and well-cultivated one; towards its mouth it drains the plain of Canton, and receives the Pe-kiang. The general direction of its course is from west to east, and it seems to be navigated to a considerable distance.

Climate.—In regard to the climate of China, a distinguishing feature is the unusual excess in which heat and cold prevail in some parts of the empire at opposite seasons of the year; as well as the low average of the thermometer in comparison with the latitude. Although Peking is nearly a degree to the south of Naples, the latitude of the former place being 39° 54', of the latter, 40° 50', the mean tempe-

rature of Peking is only 54° of Fahrenheit, while that of Naples is 63°. But as the thermometer at the Chinese capital sinks much lower during the winter than at Naples, so in summer it rises somewhat higher. The rivers are said to be frozen for three or four months together, from December to March; while, during the last embassy in September, 1816, a heat of between 90° and 100° was experienced in the shade. It is well known that Naples and other countries in the extreme south of Europe are strangers to such a degree of long-continued cold, and are not often visited by such heats. Europe, observes Humboldt, may be considered altogether as the western part of a great continent, and therefore subject to all the influence which causes the western sides of continents to be warmer than the eastern; and at the same time more temperate, or less subject to excesses of both heat and cold, but principally the latter. The mean annual temperature of Canton and Macao, which lie nearly under the tropic, is what commonly prevails in the 30th parallel; and it is surprising to contrast their meteorological averages with those of Calcutta, which stands very nearly in the same latitude *. The total fall of rain varies greatly from one year to another; the average annual quantity is about 70 inches, but it has been known to reach 90 inches and upwards. Vegetation is checked in the interval from November to February, not less by the dryness than by the coldness of the atmosphere: the three winter months being known sometimes to elapse with scarcely a drop of rain. The north-east monsoon, which commences at Canton and in the adjacent seas to the southward and eastward in September, blows strongest from December to February, and begins to yield to the opposite monsoon in March or April. About that period the southerly winds come charged with the moisture which they have acquired in their passage over the sea through warm latitudes; and this moisture is suddenly condensed into thick fogs as it comes in contact with the coast of China, which has been cooled down to a low temperature by the long-continued northerly winds. The latent heat given out by the rapid distillation of this steam into fluid, produces the sudden advance of temperature which takes place about March; and its effect is immediately perceptible in the stimulus given, by this union of warmth with moisture, to vegetation of all kinds. With the progressive increase of heat and evaporation commence those rains which tend so greatly to mitigate the effects of the sun's rays in tropical climates. In the month of May the fall of rain has been known to exceed twenty inches, being more than a fourth of all the year, and this keeps down the temperature to the moderate average of about 75°, while in Calcutta there is no portion of the year more dreaded than May. At length the increasing altitude of the sun, which becomes just vertical at Canton about the solstice, and the accumulated heat of the earth, bring on the burning months of July, August, and September, which are the most oppressive and exhausting of the whole year. The extreme rarefaction of the atmosphere now begins to operate as one of the causes tending to the production of those terrible hurricanes, or rushes of wind, called typhoons, which are justly dreaded by the inhabitants of the south of China; but which chiefly devastate the coasts of Hainân, and do not extend much to the north of Canton. The principal circumstances to be observed concerning these hurricanes are, the state of the barometer previous to and during the storm, the influence of the moon, and the localities in which they prevail. The barometer falls slowly for many hours, often a whole day before the commencement, the mercury sometimes descending nearly to 27 inches during the progress of the gale; while its rising is a sure sign of subsidence. Another sign of the approaching storm is the long and heavy swell which rolls in upon the sea-beech, without any apparent cause, for some time before the hurricane begins; but which may perhaps be explained by so much of the usual pressure of the atmosphere (equal to two inches, or a fifteenth part of the mercurial column) being removed from the surface of the water; a circumstance which may likewise partly account for the overwhelming seas which are so much dreaded by ships encountering the typhoons. In addition to the prognostics already noticed, the storms are preceded by a thick muddy appearance of the atmosphere, and a show of unusual disquiet among the sea-fowl. They seldom last forty-eight hours, and their duration is commonly confined to twenty-four, or less.

* In the winter of 18[illegible], a fall of snow occurred at Canton, two and a half inches in depth.

Natural History.—As regards the natural history of China, there is no subject on which Europe is less indebted to the Romish missionaries. The Jesuits, while employed in constructing their excellent map of the empire, which of course required that they should have free access to every part, lost an opportunity, which may perhaps never again occur, for investigating and describing its natural productions. The studies of zoology, botany, and mineralogy, it must however be observed, were then far short of their present state of advancement. We must here confine ourselves to a general statement of the most remarkable productions of China in the animal, vegetable, and mineral kingdoms, as they have been made known to us by later researches; observing, that in a country whose interior is so little accessible to Europeans, there must be a great deal that remains to be known and described. The animals, as well as vegetables of China, belong principally to the temperate zone; since the low average of the thermometer (which, as far south as Canton, is little above 70°), and the cold winters, are unfriendly to the existence of numerous tropical tribes which are found in corresponding latitudes of India. Animals being, for obvious reasons, more generally diffused over continents than plants, it follows that the number of cases in which the zoological productions of China have been found peculiar to that country are rare in comparison with the botanical ones. The larger and more ferocious descriptions of carnivorous quadrupeds are not common in a country so well peopled and cultivated. In the forests of Yunnân, to the south-west, the Bengal tiger is said to exist, and the animal is well known to the Chinese; but at Canton, so nearly in the latitude of Calcutta, it is quite a stranger. Lions are almost a fabulous animal with them. The woods of the south abound in a small but fierce description of wild cat, which is fattened in cages for the table. The domestic dog of China is uniformly one variety, about the size of a moderate spaniel, of a pale yellow and occasionally a black colour, and a coarse bristly hair on the back; sharp upright ears and peaked head, not unlike a fox's, with a tail curled over the rump. Bears are common in the hilly wooded parts of Chansy, west of Peking. Of the common ruminant animals, the Chinese possess several varieties of deer, particularly a spotted kind kept about their residences. Gerbillon describes a species of antelope abounding on the borders of Mongol Tartary, but called by the Chinese *huâng-yâng*, 'yellow goat.' The sheep of China are the large-tailed kind; and, as the people never use milk, cows are rare and of a peculiarly small kind. The buffalo used in ploughing is also very small, with a skin of slate colour, thinly covered with hairs. Dromedaries are much used as beasts of burthen between Peking and Tartary; but in China Proper the reasons which cause human labour to supplant every other have prevented their being adopted. Chinese horses are not numerous, and of a poor and stunted breed, being very ill fed and kept. Asses and mules are common in the north of the empire the mules are generally of a good size, and said to bear a higher price than horses, as being capable of more labour on less food. Of pachydermatous animals, the domestic pig of China is well known in England, and has been freely introduced into our farm-yards. The wild boar may be found in the half-reclaimed countries on the western borders, but not in Central China, nor on the east coast, where tillage and population have reached their present height. Of the other wild pachydermatous tribes, the elephant is not at present an inhabitant of China, unless it be in Yun-nân, nor is he used for purposes of either peace or war. The one-horned rhinoceros is found in the forests of the extreme west and south. Of rodent animals, the common rat attains to an unusual size, and is well known to be eaten by the lowest orders of the Chinese. Mr. Gray has described a glirine animal discovered by Mr. Reeves, being nearly allied to the bamboo rat of Sumatra, as a new genus, 'in teeth and general appearance; most nearly allied to *spalax*, from which it differs in its tail of moderate length, its exposed eyes and ears, and the more complex character of its molar teeth.'

The ornithology of China is distinguished by some splendid varieties of gallinaceous birds, as the gold and silver pheasants, to which has been lately added the *Reeves's pheasant*, the longest tail-feathers of which approach the extraordinary dimensions of six feet. Another description

is called the *medallion* pheasant, from a beautiful membrane of resplendent feathers which is displayed or contracted according as the animal is affected. China abounds in wild fowl of all kinds, and particularly in immense flocks of geese, observable during winter near Canton. The *yuen-yang*, a teal of splendid plumage, has been called the 'mandarin duck,' and is remarkable for the attachment between the male and female. The fishing corvorant, employed on the shallow lakes of the country in capturing fish, has been described as a brown pelican with white throat; body whitish beneath, spotted with brown; tail rounded; irides blue, and bill yellow. Among the miscellaneous birds of China may be enumerated quails which are often trained to fight; the common ringdove, of which great numbers breed in the woods about Canton; and the peculiar crow of the country, marked with white about the neck.

Of reptiles, it is remarkable that the largest kinds of saurians, as the crocodile and alligator, are unknown even as far south as Canton, probably in consequence of the vast population and traffic that exists on the rivers. Great numbers of the small lizard tribes are visible during the hot months, some of them infesting trees and shrubs, while others inhabit holes in rocks or old walls. Several fresh-water tortoises have been lately sent home, and two new genera of batrachians, or the frog kind, are described by Mr. Gray. Notwithstanding its situation under the tropic, Canton is little infested by the venomous kinds of serpents; the species most dreaded is a smallish slender snake, between two and three feet in length, called by the Chinese 'the black and white,' from being surrounded from head to tail with alternate rings of those colours.

Of fishes, a large collection of Chinese specimens has been lodged by Mr. Reeves in the British Museum. The golden carp is one of the most distinguished kinds, and has long been bred in Europe from the original specimens which were carried by the Dutch first to Java and thence to Holland. Of edible sea fish, the best kinds near Canton are a sort of rock-cod, and a flat fish called *Tsâng-yu* by the Chinese, and 'pomfret' by Europeans. Soles are good and plentiful, but the fish most valued by native epicures is the sturgeon.

Among insects, the locust commits great ravages occasionally in particular districts, and rewards are given for its destruction. Some of the most poisonous tribes, as scorpions, are not met with at Canton; but the centipede, which the Chinese call by exactly the same name of pĕ-tso, 'hundred feet,' is common. A monstrous spider has been seen, inhabiting trees, and attaining to a size and strength that enable it to devour small birds entangled in its webs. Dr. Abel notices the *Scarabæus molossus*, the *Cerambyx farinosus*, and the mole-cricket of a large size. At a mountain lying eastward of Canton, called Lo-fow-shan, there are butterflies of a gigantic size and very brilliant colours, a selection of which are sent annually to Peking. The pĕ-lă-shoo, or wax-tree, affords nourishment to an insect which is supposed to belong to the Coccus tribe, but which has never yet been correctly ascertained.

At the head of Chinese botany may properly be placed the tea-plant. The specimens from the black and green tea countries differ slightly in the leaf, the latter being a thinner leaf, rather lighter in colour, and longer in shape, than the other; though the Chinese themselves acknowledge that either black or green tea may be prepared from any tea-plant. The *Camellia* bears the same name in China with the tea-shrub, and possesses most of its botanical characters; they in fact constitute two genera very closely allied. The *Laurus camphora*, one of the most remarkable productions of China as well as Japan, is a fine timber-tree, growing in the southern provinces to the height of fifty feet. From the seeds of the *Dryandra cordata* the Chinese extract a varnish for boats, and for the coarser implements of domestic use. The fine japan varnish, however, is obtained from the *Tsĭĕ-shoo*, or lacker-shrubs, a species of *Rhus*, from which the varnish distils like gum. The Chinese procure their tallow from the *Croton sebiferum*, the seed of which, as soon as it is ripe, opens and divides into three parts, discovering as many kernels within the capsule, each attached by a separate foot-stalk, and covered with the vegetable grease of a snowy whiteness. The plant from which the pithy substance vulgarly called 'rice-paper' is prepared, seems to be a leguminous species growing in marshes, and found in some parts of India. The square pieces purchased in China are obtained from the stem, which, not being above an inch or two in diameter, is cut in a circular manner, and the cylinder in this manner rolled out and flattened. The *Smilax*, or China root of commerce, commonly known as a sudorific, may be seen growing near Canton. That valuable medicine rhubarb is cultivated to the northward, in the cold and mountainous province of Shensy. The Chinese cassia, an inferior cinnamon, is grown in Kuăng-sy, and largely exported in European ships.

Among the most remarkable fruits of China are three distinct species of orange, as different as one sort of fruit can be from another of the same genus. The first is the 'China orange' of Europe; the second is of a pale yellow colour, but very sweet, and with a highly aromatic rind; the third, and perhaps best sort, has a deep crimson rind when ripe, quite detached from the fruit, the lobes of which are almost loose, and surrounded with a kind of net-work of fibres. Another description of *citrus*, of the lemon kind, by the exercise of some horticultural ingenuity, is made to run entirely into rind, the whole terminating at the head in long narrow processes like fingers, whence it has obtained the appellation of Fŏ-show, 'the hand of Fŏ.' Among the peculiar fruits of China, the *Lichi* has been naturalized in Bengal. Another of the Dimocarpus sort, called *Loong-yen*, or 'dragon's eye,' is much smaller, and has a smoother skin. The *Loquat* is a fine fruit (when well ripened) of the *Mespilus* kind. The *Wampee*, as it is called at Canton, has been compared to the gooseberry, which it resembles only in size; its fruit, which grows in bunches on a good sized tree, has a yellow skin, inclosing a rather acid pulp that surrounds two or three seeds of a green colour. At the head of cultivated flowers the Chinese place the *Nelumbium*, in consideration of both its beauty and utility. The seeds, in form and size like an acorn without its cup, resemble nuts in flavour: the roots are sliced and eaten as fruit. Another highly esteemed flower is the *Olea fragrans*, allied to the olive of Europe, and remarkable for the fine scent of its blossoms. The famous *Mow-tân*, or Tree-peony, flourishes only in the north of the empire. A flower much cultivated is the *Chrysanthemum Indicum*, valued for the variety and richness of its colours, and now common in this country. The *Choo-lân* (Chloranthus inconspicuus) is used in scenting the tea that bears its name.

The variety of surface through the wide extent of the empire affords a rich fund of minerals and metals. There can exist no doubt of the abundant supply of coal throughout China, nor of its general use, which we find from Marco Polo was known to them before its adoption in Europe. Lime they possess in all its combinations. The dark grey marble used at Canton is coarse, and unsusceptible of a fine polish; the shops contain large quantities of striated gypsum or alabaster. At the head of minerals the Chinese place their famous *yu* stone, which is nephrite, or jade. As the country abounds in the primitive rocks, it is consequently rich in metals. Gold is obtained in the native state from the sands of the rivers in Yun-nân, near the frontiers of the Burmese country, well known for its richness in that metal; in Yun-nân also silver mines are worked. Ordinary copper comes from Yun-nân and Kuei-chow, and an abundance of malachite, or green copper-ore, is obtained near the great lake in Hoo-kuăng. The famous pĕ-tung, or white copper, which takes a polish not unlike silver, comes from Yun-nân: a considerable quantity of quicksilver is obtained in Kuei-chow; and there is a rich mine of tutenague or zinc in Hoo-pĕ.

Government.—The government of China is in principle an absolute despotism, and the succession depends on the will and nomination of the reigning emperor. The authority of a father over his family is well known to be the exemplar or type of political rule in the country. It is the object of the first of the 'Four Books' of Confucius to inculcate, that from the knowledge and government of oneself must proceed the proper economy and government of a family; and from the government of a family, that of a province and of a kingdom. The emperor is called the father of the empire; the viceroy of the province over which he presides; and the mandarin, or magistrate, of the city which he governs; and the father of every family is the absolute ruler of his own household. 'There is nothing more remarkable,' observes Mr. Davis, 'in their ritual, and in their criminal code, than the exact parallel which is studiously kept up between the relations in which every person stands to his own parents and to the

emperor. For similar offences against both he suffers similar punishments; and at the death of both he mourns the same time, and goes the same period unshaven; and both possess nearly the same power over his person. Thus he is bred up to civil obedience *tenero ab ungui*, with every chance of proving a quiet subject at least. Such institutions certainly do not denote the existence of much liberty; but if peaceful obedience and universal order be the sole objects in view, they argue on the part of the governors some knowledge of human nature, and an adaptation of the means to the end.' The emperor is head of the state religion, and, as high-priest of the empire, can alone, with his immediate representatives, sacrifice in the government temples. No hierarchy is maintained at the public expense, nor any priesthood attached to the Confucian or state religion, as the sovereign and his great officers perform that part. The two separate religious orders of Fo (Budha) and Taou, which are only tolerated, and not maintained, by the government, derive support entirely from their own funds, or from voluntary private contributions.

With respect to the machinery of civil government, the emperor's principal ministers form the 'interior council-chamber,' and the chief councillors are four in number, two Tartars and two Chinese; the former always taking precedence. Below these are a number of assessors, who form the chief council of state. The body whence these chief ministers are generally selected, is the Hân-lin, a sort of imperial college, or National Institute. The details of government business are distributed among six boards or tribunals, viz., 1. The board of civil appointment, which takes cognizance of the conduct and administration of all civil officers; 2. The board of revenues, which regulates all fiscal matters; 3. The board of rites and ceremonies; 4. The military board; 5. The supreme tribunal of criminal jurisdiction; 6. The board of public works. A very peculiar feature of the government is observable in the Too-chă-yuen, or office of censors, the members of which are generally styled Yushe. There are two presidents, a Tartar and a Chinese, and the members consist in all, of about forty or fifty, several of whom are sent to various parts of the empire, as imperial inspectors, or perhaps, more properly speaking, spies. By the antient custom of the empire, they are privileged to present any remonstrance to the sovereign without danger of losing their lives; but they are frequently degraded if their advice is unwelcome. The provinces are placed under the principal charge, either, singly, of a Foo-yuen, or governor, or two provinces together are made subject to a Tsoong-to, or general governor, who has a Foo-yuen under him for each single province. Canton and its adjoining province are together subject to the Tsoong-to, commonly called by Europeans the Viceroy. In each separate province there is a chief criminal judge and a treasurer, the latter having usually cognizance of civil suits, but his special business is the charge of the territorial revenue. With this, he first of all defrays the civil and military expenses of his province, and whatever surplus remains is remitted by him to Peking, in silver or in produce. The total surplus of all the provinces remitted to the capital is about 11 or 12 millions sterling annually, which has very erroneously been taken for the whole revenue of the empire. The subordinate cities and districts of each province in the three ranks of Foo, Chow, and Hien, are under the charge of their respective magistrates, who take their rank and titles from the cities they govern. The total number of civil magistrates through China is estimated at 14,000. At Canton the amount and importance of the European trade has given rise to the special appointment of the Haekuân, or commissioner of customs, called by Europeans Hoppo, who ranks as third in the province, but has no territorial jurisdiction beyond the trade. No individual in China can hold a magistracy in his own province; and each public officer is changed about once in three years, to prevent growing connexions with those under his government. A son, a brother, or any other very near relation, cannot hold office under a corresponding relative. The various degrees of civil and military offices are partly distinguished by the colour of the ball which they wear at the apex or point of their conical caps. These are red, light blue, dark blue, crystal, white-stone, and gilt. Each ball is accompanied by its corresponding badge, which is a piece of silk embroidery, about a foot square, with the representation of a bird, or other device, on the breast and back of the ceremonial habit; together with a collar or necklace of very large beads, down to the waist.

The whole amount of military throughout the empire including the militia of each district, has been estimated at 700,000, of which the largest portion are fixed to their native districts, and cultivate the land, or follow some other pursuit. The whole are under the direction of the military tribunal, or board, at Peking. The trusty Tartar troops are ranged under the eight standards, each of them comprising 10,000 men, and making a total of 80,000 for a standing army. Very few mounted soldiers were seen by either of our embassies, and whatever may be their actual amount, they are said to be nearly all Tartars. A great difference seems to exist between the pay of Tartars and Chinese. One of the former, being a foot-soldier, receives about five-pence a day, with an allowance of rice; one of the latter, only four-pence, without the rice. The principal arms of the cavalry are bows and arrows, the bow being of elastic wood and horn combined, with a string of silk. Their swords are generally ill made, and their matchlocks are considered by them as inferior weapons to the bow and arrow. Some are provided with shields, composed of rattans turned spirally round a centre.

The residence of the emperor and his court for some hundreds years past has been removed from Nanking to Peking, a city whose population has been stated at double that of London; but various reasons conduce to render this altogether improbable. Notwithstanding the great extent of the area enclosed within the walls, there are so many open spaces of great extent, that it is difficult, taking the lowness of the one-storied buildings into consideration, to imagine how such an immense number can exist within its precincts. A large portion of the Northern or Tartarian city is occupied by the enclosure which contains the palace and pleasure grounds of the emperor; the remainder is studded over at intervals with official or religious buildings, all of them surrounded by large open courts; and the Chinese city to the south has some very extensive spaces occupied by immensely-spreading public buildings, with grounds attached. There are, besides, large sheets of water, and gardens devoted to the growth of vegetables for the city. The streets of Canton and of most of the cities are extremely narrow, admitting only three or four foot passengers abreast; but the principal thoroughfares of Peking, connecting its different gates, are fully one hundred feet in width. These are unpaved, probably in consequence of the difficulty and expense of procuring stone in the flat that surrounds the city. In rainy weather the principal ways are said to be in a dreadful state, from the want of proper drains, and in consequence of the perfect level of the ground not allowing the water to run off.

Population.—The population of the empire has naturally been a subject of investigation with those persons who had the best opportunities of pushing the inquiry with success. A number of natural, social, and political causes no doubt combine to explain the very dense population which the country unquestionably contains. The advantages which China possesses from nature have been improved to the utmost by its industrious inhabitants: agriculture, the source of food, has been honoured and encouraged beyond every other species of industry. There is no meadow cultivation whatever; nothing is raised by labour for the food of cattle, but all for man, since the very small number of horses, oxen, or sheep maintain themselves as they can on pastures unsusceptible of cultivation; and in no other country is so much food derived from the waters. The political causes which tend to swell the population of China are numerous and powerful. Among these are the paternal rights, which continue during life, and render a son, even in that over-peopled country, an important acquisition. The laws of the empire grant life sometimes even to a condemned homicide, if the want of another son or grandson render his existence necessary to the support of a parent. The other cause, which renders male children so desirable, is the sentiment regarding sacrifices at the tombs and in the temples of ancestors. In default of male children there is a legalized mode of adoption by which the line is perpetuated and the family prevented from becoming extinct. Even the tendency of slavery to check population is counteracted by a law which makes the owners of domestic slaves, who do not procure husbands for their females, liable to prosecution; but the perpetuation of families does not tend more to the density of the population than the manner in

which those families live and are maintained. It is a universal system of clubbing on the most economical plan, and the claims of kindred being universally admitted and enforced, the property of families is made to maintain the greatest number possible. Another political cause is the obstacle that exists, both in law and prejudice, to emigration. Besides the statute in the penal code, which punishes this offence according 'to the law against communicating with rebels and enemies,' the abandonment of his native place, and of the tombs of his ancestors, is always abhorrent to the mind of a Chinese. To the above list of causes tending to produce the excessive population of China, must be added the uninterrupted peace which has been enjoyed by that country since the complete establishment of the Manchow dynasty, a period now considerably exceeding a century.

Under the circumstances above briefly enumerated, there is less difficulty in admitting the extraordinary amount of population which has been given from various authorities, involving, however, statements occasionally so contradictory that it seems not altogether easy to come to any satisfactory result as to the actual number. Grosier made the population in 1743 amount to 198 or 200 millions. There is nothing incredible in this, considering that the area of China Proper is eleven times that of the British Islands. But on comparing it with the 333 millions of Lord Macartney's authority, just fifty years afterwards, an increase of considerably more than half within that period seems very large. When the census was taken by Kien-loong, a little before Lord Macartney's embassy, that emperor issued a proclamation addressed to the whole of his subjects, calling on all ranks and conditions of men to economize the gifts of heaven, and by industry to increase the quantity; for, observing the increase of population since the period of the conquest, he looks forward with deep concern to the future, when the numbers of the people shall have exceeded the means of subsistence. According to this highest authority then, a very great increase had really taken place; but when we come to the particulars, they seem to stagger all belief. The emperor goes on to say, that in the 49th year of Kâng-hy, the second sovereign of his family (and under the old system of the poll-tax), the population of the empire was rated at about 23,312,000; and that by the late census, according to returns from all the provinces, it amounted to 307,467,200. Unless some way can be found of reconciling such an account with bare possibility, it seems unworthy of serious acceptance. But we must remember that a great portion of the country was actually *unsubdued* in the reign of Kâng-hy. The southern parts of the empire held out obstinately against the Tartars, and some of them were long governed by independent Chinese rulers. These then for the time must have been excluded from a census of the subjects of the Manchow dynasty. Again we must call to mind that the census so remarkable for its small amount under Kâng-hy was with reference to a poll-tax, and to military service, two objects which were of all others the least calculated, during an unsettled and half-subdued state of the country, to ensure a correct or full return. The Manchow conquest is said, by the combined effects of war and flight, to have reduced the population of China to less than half its amount under the Ming race; but the conquest has since been followed by almost unexampled peace and prosperity during a period considerably exceeding a century. A census, said, on the authority of a Chinese statistical work, to have been taken in 1812, goes beyond the amount given to Lord Macartney, and makes the population reach the number of 360,279,897. Our faith in this must of course be determined by the degree of credit to be attached to the Chinese census. The account is said to be made up from the returns received in detail from every village in the empire, in which the houses are provided with what is called a *mun-pae*, or 'door-tables,' on which are inscribed all the individuals of a family. The lists are transmitted through several channels before they reach Peking, and may therefore occasionally, if not always, be liable to falsification by those who wish to flatter the emperor with the idea of increase. Taking the area of China at 1,200,000 square miles, in round numbers, we should have the latest estimate, 300 inhabitants on a square mile, which is more than England or Holland possesses.

Revenues.—The revenues of China are derived principally from a land-tax, and the monopoly of salt, to which are to be added something for customs and transit-duties. At the Manchow conquest a capitation or poll-tax was imposed, but this was soon taken off again; and the second emperor of the dynasty ordained that the land-tax, which under the Chinese had been taken from the cultivators, should ever after be taken from the land-owners. The subject of the Chinese revenues seems never before to have been very clearly understood. From the produce of taxation in each province, the treasurer of that province deducts the civil and military expenses, and all outlays, whether for public works or otherwise, remitting the surplus to Peking, either in money or kind. This surplus has been the only point clearly ascertained, and it has been very erroneously mistaken for the gross amount of the revenue. The difficulty of ascertaining the real expense that attends the administration of the empire arises from a considerable portion of the taxes being levied in commodities instead of money, as grain, salt, silks, and stores of different sorts. A portion of the allowances of public servants, especially at Peking, as well as of the stipends of imperial relatives, is paid in the shape of rations and supplies. Du Halde states the total revenue of the empire, including the provinces, at 'about 200 millions of taels (or upwards of 60 millions sterling), of which only 12 millions sterling are transmitted to Peking.' The accuracy of the latter amount seems pretty nearly confirmed by what appeared in a Peking gazette of 1833. A Tartar officer therein states, 'that the whole receipts at Peking do not exceed 40 millions of taels, which is 12 or 13 millions sterling:' again, it appears from a statement translated by Dr. Morrison, that the surplus from land-tax, transmitted to Peking by two provinces, was 5 millions of taels, which, taken as an average for eighteen provinces, would give 45 millions; but one or two of them supply much below that average, and the true total may therefore be 40 millions, as above.

Laws.—We possess a translation of the Tartar-Chinese penal code, from Sir George Staunton, and of this specimen of legislation a very advantageous comparison with other Asiatic systems has been made by an able critic in the 'Edinburgh Review.' 'When (says he) we turn from the ravings of the Zendavesta, or the Puranas, to the tone of sense and of business of this Chinese collection, we seem to be passing from darkness to light; from the drivellings of dotage to the exercise of an improved understanding; and redundant and minute as these laws are, in many particulars, we scarcely know any European code that is at once so copious and so consistent, or that is nearly so free from intricacy, bigotry, and fiction. In everything relating to political freedom or individual independence, it is, indeed, wofully defective; but for the repression of disorder, and the gentle coercion of a vast population, it appears to us to be, in general, equally mild and efficacious.' If we estimate Chinese legislation by its result, we shall find it (as Sir George Staunton observes) wholly inconsistent with the hypothesis of a very bad government, or a very vicious state of society. Mr. Ellis, who had long been in Persia and India, pronounced China 'superior to the other countries of Asia, both in the art of government and the general aspect of society;' and adds, 'that the laws are more generally known, and more equally administered; that those examples of oppression, accompanied with infliction of barbarous punishment, which offend the eye and distress the feelings of the most hurried traveller in other Asiatic countries, are scarcely to be met with in China; that the proportion which the middling orders bear to the other classes of the community appeared to be considerable; that, compared with Turkey, Persia, and other parts of India, an impression was produced highly favourable to the comparative situation of the lower orders.' It is a popular maxim with the Chinese, that to violate the law is the same crime in the emperor as in a subject. 'This plainly intimates (observes Mr. Davis) that there are certain sanctions which the people in general look upon as superior to the will of the sovereign himself: these are contained in their sacred books, whose principle is literally, *salus populi suprema lex*; and however much this principle may at times be violated under the pressure of a foreign Tartar dominion, it nevertheless continues to be recognised, and must doubtless exercise more or less influence on the conduct of the government.'

Moral Character, &c.—The moral character of the Chinese people is a compound of bad and good traits, which, as usual, may be traced to the influence of their political and social system. The late Dr. Morrison seems to have formed a fair estimate of a nation with whom he was better acquainted than most Europeans. 'In China (he ob-

serves) there is much to blame, but something to learn; and moral instruction is ranked above physical.' The consequence is, that industry, tranquillity, and content, are unusually prevalent in the bulk of the population. Notwithstanding his power is absolute, the emperor himself always endeavours to prove that his conduct is based in reason and benevolence, the truth of the argument being, of course, a distinct affair. From the habits in which they are brought up, the people are more ready to reason with each other than to resort to violence. The advantageous features of their character, as mildness, docility, industry, peaceableness, subordination, and respect for the aged, are accompanied by the vices of insincerity and falsehood, with their consequences, mutual distrust and jealousy. Lying and deceit, being generally the refuge of the weak and timid, have always been held among us as disgraceful vices, while the Chinese, at any time, do not attach the same degree of disgrace to deceit, and least of all when it is practised towards a European. It would however be as unreasonable to infer the character of the whole nation from the unfavourable aspect in which it appears at Canton, a trading seaport, as to form an estimate of our national character in England from an experience equally limited and disadvantageous. It has, in fact, been considered as a matter for surprise, that the Chinese at Canton should be no worse than we find them: they are well acquainted with the maxim of their government, by which it professes 'to rule barbarians like beasts, and not like native subjects;' and they are continually supplied by the local authorities with every motive to behave towards strangers as if they were a degraded order of beings. Their conduct to Europeans therefore is different from their conduct among themselves.

In their physical characteristics, the Chinese have been recognised as superior to many other Asiatics. A finer shaped and more powerful race of men exist nowhere than the coolies or porters of Canton; and as sailors, they have been found stronger and more efficient than natives of India on board of English ships, but it has always been both difficult and expensive to employ them. Though the Chinese are allied to the Mongols in the general cast of their features, the harsher points of the latter are softened down in the former considerably: in the thickness of the lips, the Chinese in some degree approaches, but by no means equals, the Negro, nor is that feature at all so prominent as in the latter; the nose is flattened, and the nostril expanded in the Chinese, but not to the same extent as in the African: there is the same lank, black, and shining hair in the case of the Chinese as in that of the North American Indians; the same obliquity of the eyes and eyebrows, turned upwards at the outer extremities, and a corresponding thinness and tufty growth of beard. The Chinese too is distinguished by a nearly total absence of hair from the surface of the body. In the smallness of the hands and feet, and of the bones of the body, compared with Europeans, he resembles the generality of Asiatics. The features of the people in the South have perhaps less of the harsh angularity of the Tartar countenance than at Peking. Among those who are not exposed to the climate the complexion is fully as fair as that of the Portuguese; but the sun has a powerful effect on their skins, and that upper portion of a man's person which is habitually exposed in the summer above his loose trowsers is often so different from the remainder, that when stripped he looks like the lower half of a European joined on to the upper moiety of an Asiatic. Up to the age of twenty, or a little more, they are often very good looking; but soon after that time the prominent cheek-bones generally give a harshness to the features as the roundness of youth wears off. With the progress of age the old men in most cases become very ugly, and the old women, if possible, still more so.

China is now politically divided into provinces, of which seven extend entirely or partly over the great plain, two comprehend the hilly districts, two others the mountainous country along the sea, and the others the mountainous country in the interior.

1. Pe-tche-li extends over the most northern and less fertile portion of the plain, but is well cultivated, and produces, besides vegetables for the supply of the capital, large quantities of millet and wheat. In it is situated PEKING, the capital of the whole empire; the capital of the province is Pao-ting-foo, a very large and populous town in which the governor resides.

2. Chang-tung comprehends a part of the plain and the peninsula of Chang-tung, on which an isolated mountain-range rises to a moderate height. It produces wheat, millet, and cotton. Its capital is Tsi-nan-foo, a large and populous town. Lin-tchin-tcheou, at the confluence of the canal with the river Eu-ho, is the deposit of goods which are carried from the southern provinces to Peking, and a very large place.

3. Kiang-su, which with the following province once formed that of Kiang-nan, comprehends the low and swampy country on both sides of the Great Canal. It chiefly produces rice and pulse, and has extensive fisheries. Besides the capital, NANKING, it contains many large towns on the banks of the canal, among which the most remarkable are Yang-tcheou-foo, which is at a short distance from the Yang-tse-kiang, and carries on an active trade; and Su-tcheou-foo, which to an extensive commerce unites great industry in manufacturing silk and cotton goods. Its principal port is Shang-hae.

4. Ngan-hoei or An-hoi, on both sides of the Yang-tse-kiang, produces, besides grain and rice, some silk. In its south-eastern districts are extensive plantations of tea, and also some mines of gold, silver, and copper. The capital is Ngan-king-foo, on the Yang-tse-kiang.

5. Ho-nan is chiefly in the plain, but its western districts are traversed by the Pe-ling mountain-range and its branches. It is rich in grain and cotton, and is supposed to contain some mines. In its south-eastern districts tea is cultivated. The capital, Khai-fong-foo, is not far from the banks of the Hoang-ho; but the most populous town appears to be Ho-nan-foo, on a river which falls into the Hoang-ho, in a richly-cultivated valley.

6. Hoo-pĕ comprehends part of the undulating portion of the plain, and the wide valleys of the Han-kiang and Yang-tse-kiang, with some mountainous districts. It lies in the centre of China, and formerly constituted, with the more southern province of Hoo-nan, one province called Hou-quang. Its fertility is very great: its products are grain, cotton, silk, and tea, which are cultivated on its north-eastern border. Its capital, Wu-tchang-foo, situated on the Yang-tse-kiang, opposite its junction with the Han-kiang, is one of the largest of the inland towns of China, and carries on an extensive commerce. King-tcheou-foo, farther to the west, likewise on the banks of the Yang-tse-kiang, has also a very extensive trade.

7. Che-kiang comprehends the south-eastern corner of the plain, and the northern portion of the mountainous country extending along the sea. It produces more green tea than other provinces, and also silk, rice, grain and pulse, in abundance. Its capital is Hang-tcheou-foo, on the banks of the Tsien-tong-kiang, at the southern termination of the Great Canal, in a very pleasant situation. According to Staunton, its population was thought to be not much less than that of Peking, and the missionaries estimated it at one million. None of the houses exceed two stories in height: the streets are well paved. It has extensive manufactures of silk and cotton goods, especially in flowered and embroidered satins, and a very active commerce, as well by means of the canal as by the river, which is navigable for large vessels up to the town. The principal port of this province is Ning-po.

8. Kiang-si extends over the eastern portion of the hilly country, along the western side of the Nan-ling range, and produces in its well-cultivated valleys and plain, grain, rice, silk, cotton, indigo, and sugar. It has some plantations of tea. The capital, Nan-tchang-foo, on the Kan-kiang, not far from the place where it falls into the lake Poyang, is a large town, and carries on a great trade. In the hilly country which begins at some distance from the lake of Poyang on the east, is the borough of King-te-ching, which is said to contain one million of inhabitants, who are occupied exclusively in the fabrication of china-ware, which is here made in the greatest perfection. The number of furnaces is said to amount to five hundred. Kan-tcheou-foo, on the Kan-kiang, not far from its source and the Mei-ling Pass, is a large town, in which Indian ink and varnish are made on an extensive scale.

9. Hoo-nan, or the southern part of the antient province of Hoo-quang, contains the remainder of the hilly country. Its productions are like those of Kiang-si. It is said to be rich in minerals. The capital, Tchang-cha-foo, on the Hong-kiang, is a large commercial town. Yo-tcheou-foo, on the channel connecting the large lake of Tung-ting with the Yang-tse-kiang, also carries on a very active trade.

10. Fo-kian, or Fochan, extends over the mountainous country on the shores of the sea opposite the island of Formosa. Some of the summits of the Nan-ling range here rise to a great height, but do not attain the perpetual snow-line. The higher parts of some of the mountain-ridges are bare; others are covered with trees, but in its extensive and fine valleys all the commercial productions of China are met with, except perhaps varnish. Its plantations of tea are extensive, and the greatest quantity of black tea is grown here. The inhabitants of this province are noted for their industry, and still more for their spirit of enterprise and their love of emigration. The numerous settlements of Chinese in the islands of India and the countries without the Ganges have been formed by them, and are continually increasing by new adventurers from Fo-kian. The capital is Fu-tcheou-foo, on the river Mingho, over which a bridge is built of thirty-three arches of fine white stone. The largest Chinese vessels can come up almost to the wall of the city, the maritime commerce of which is very considerable, and its population greater than that of Canton. Tsuen-tcheou-foo, between Fu-cheou-foo and Amoy, is likewise a large town. A great number of vessels sail hence to the neighbouring countries. It has a bridge built over an arm of the sea, on 300 piers of black stone. Here is also the harbour of Amoy, which was formerly visited by Europeans. [AMOY.]

11. Quang-tun, or Canton, extends over the whole southern coast from 117° E. long. to the very boundary of Cochin-China, and is likewise mountainous, but its mountains are not so high as those in Fo-kian. It has a great number of fine and wide valleys, and the plain about Canton is of considerable extent: it produces all the commercial commodities of China, except tea and varnish. The number of its harbours is considerable, but Canton is alone visited by Europeans. This town is the capital of the province. [CANTON.] Fochan, lying south-west of Canton, at a distance of about 20 miles, is said to contain a population of one million of souls, and to have numerous manufactures of silk, cotton, china-ware, and colours.

12. Quang-si, extending on both sides of the Ta-si-kiang, is covered with mountains: the valleys, which are generally narrow, occupy a small portion of its surface. The mountains belonging to the Nan-ling range, enclosing the northern side of the province, rise to a great height, and some summits above the perpetual snow-line. The forests on the declivities of the hills are extensive. Its productions are rice, silk, and timber, and it is supposed to contain gold and other metals. A mountainous district, towards the northern boundary of this province, is inhabited by the Tchang-Colas, an aboriginal and independent tribe, differing from the Chinese in language and manners. The capital of the province, Kuei-ling-foo, lies in a narrow but fine valley.

13. Kuei-tchcow, to the north of Quang-si, is one of the most mountainous provinces of China, being traversed in all its length by the highest portion of the Nan-ling range, several summits of which are always covered with snow. In these mountains live the Seng Miao-tsee, an aboriginal tribe, who differ in language and manners from the Chinese, and often make war on them. Many fortresses have been erected in the narrow parts of the valleys to stop their incursions. Its productions are timber and metals, gold, silver, &c., but especially copper and quicksilver. The capital is Kuei-yang-foo, a comparatively small town, its circuit being not much more than two miles.

14. Yun-nan, the most south-western province, bordering on Cochin-China, Siam, and the Birman empire, forms an extensive but uneven table-land, studded here and there with high mountains, especially towards the north, where there are several snow-capped summits. The mountains towards the south, on the boundary line of the Birman empire and Siam, are inhabited by a tribe of mountaineers, called Lolos, or Lowas, who are only nominally dependent on the Chinese. Its commercial wealth consists of the produce of its mines, gold, silver, copper, &c., and of its forests, which contain timber trees, and several kinds of rare wood. The capital, Yun-nan-foo, situated on the least mountainous part of the table-land, is a considerable place, and carries on an active trade with the Birman empire. A much-frequented road, running mostly on the banks of the Yang-tse-kiang, connects this town with the interior provinces of China, and another passes hence, west to Yang-tcnang-foo, another considerable town, perhaps larger than Yun-nan. From this place the road continues to the Irawaddi river, and to Bhanmo, in the Birman empire. A considerable trade is carried on by this route. [BIRMAN EMPIRE.]

15. Se-tchu-an, the largest of the provinces, is nearly everywhere enclosed by high mountain-chains, and its interior is traversed by lower ranges. Its valleys are commonly wide, and often expand into plains. The soil is rich, and produces every kind of grain, as well as rice and sugar, in abundance; but its commercial riches consist principally of silk, timber, and different kinds of metals. Its capital, Tching-too-foo, situated on an island formed by the Min-kiang, in an extensive and richly-cultivated plain, is a place of considerable trade, and very populous. Koci-tcheou-foo, on the banks of the Yang-tse-kiang, is one o. the most commercial places in the interior of China, and very populous.

16. Shen-si is more covered with rugged mountains than Se-tchu-an, and contains a much smaller portion of cultivable land; yet the wide valleys through which the Wei-ho and Han-hiang run are very fertile, and produce abundance of wheat, millet, and pulse, but little rice. The capital is Si-ngan-foo, on the Wei-ho, once the metropolis of the whole empire, a town so large that it is compared with Peking itself; it is strongly fortified, and carries on a considerable trade.

17. Shan-si is still more mountainous than Shen-si; it has one wide and fertile valley along the banks of the Fen-ho, or Fien-ho, which is well cultivated, and studded with villages and towns. It exports wheat, millet, raisins, iron, and coal. The capital is Tai-yuen-foo, a large place, with considerable manufactures in silk and carpets, and some trade. Tai-tong-foo is one of the principal fortified places near the Great Wall.

18. Kan-si, the most north-western province of China, consists of the western portion of Chen-si, to which has been added a comparatively narrow tract of land, which extends far westward to the centre of Asia. This tract has been added with the view of separating the warlike and wandering tribes, which inhabit the table-lands to the north and west of China, from one another, and of preventing their incursions into China. The eastern part of this province is studded with high and many snow-capped mountains, and the western extends over the stony and sandy deserts of Central Asia; the whole is a poor country, and thinly inhabited. The capital is Lan-tcheou, a small place, on the banks of the Hoang-ho, which however carries on a brisk trade with the tribes inhabiting the table-lands to the north and west of it.

To these eighteen provinces may be added the province of Leao-tong, or Mougden, which extends along the northern shores of the Hoango-Hai, or Yellow Sea. It constituted formerly a part of Manchuria, but after the present dynasty had ascended the throne of China, this portion was separated from it, and considered as the domain of the imperial family. It is divided from China by the eastern extremity of the Great Wall, and from Mongolia by a stockade of wooden piles, which extends to the mountains which separate it from Corea. This country is covered with high mountains, except on the banks of the Leao-ho, where there is a plain of considerable extent, and pretty well cultivated. Here is the capital, Mukden, or Mougden, now called Fung-thian-foo, a place of moderate extent, in which are the tombs of the Manchow dynasty. Towards the boundary of Corea is Fon-Hoan, traversed by the only road which connects Corea with China, and on which some trade is carried on.

History.—Without attempting to deny to the historical records of the Chinese empire a very high degree of antiquity it is now pretty generally admitted, on the testimony of the most respectable native historians, that this point has been considerably exaggerated. In reference to the earliest traditions of their history, a native commentator observes, 'it is impossible to give entire credit to the account of these remote ages.' The persons styled Fohy, Shin-noong, and their immediate successors, must be ranged rather under the head of mythology than of history; resembling those demi-gods and heroes of Grecian fable who rescued man kind from primeval barbarism. The fabulous part of Chinese history commences with Puan-koo, who is represented in a dress of leaves, and concerning whom every thing is wild and obscure. He is said to have been followed by a number of persons with fanciful names, who, in the

style of the Hindoo chronology, reigned for thousands of years, until the appearance of Fohy, who is said to have invented the arts of music and numbers, and taught his subjects to live in a civilized state. At length came Yaou and Shun, who are stated to have been the patterns of all Chinese emperors. To the age of Shun they refer their tradition of an extensive flooding of the lands, which by some has been identified with the Mosaic deluge. It was for his merit in draining the country, or drawing off the waters of the great inundation, in which he was employed eight years, that 'Yu the Great' was chosen by Shun for his successor. He commenced the period called Hea, upwards of 2100 years before Christ; and the whole of the long space of time included under Hea and Shang is full of the marvellous: until Woo-wong was called upon to depose a tyrannical emperor, the last of the Shang, about 1100 years B.C. With him began the period of Chow, which may be considered as the commencement of authentic history, and during which Confucius himself lived. Though it might be going too far to condemn all that precedes that period as absolutely fabulous, it is still so much mixed up with fable as hardly to deserve the name of history. The race of Chow filled the long period of 800 years, during which China appears to have been divided into a number of petty independent states, engaged in perpetual disputes with each other. The king of Tsin had long been growing powerful at the expense of the other states: he fought against six nations, and at length compelled them all to acknowledge his authority. The chief government began now to assume the aspect of an empire, which comprehended that half of modern China lying to the north of the great river Kiang, but which was doomed, after the lapse of some centuries, to be split again into several parts. The first emperor of the Tsin dynasty rendered himself famous by the erection of the Great Wall, which has now stood for 2000 years; as well as by ordering all the books of the learned (including the writings of Confucius), to be cast into the flames. About the year 201 B.C., the race of Tsin was succeeded by that of Hân, which filled one of the most celebrated periods of Chinese history. It was now that the Tartars became the cause of endless disquiet to their more civilized and peaceful neighbours, who were frequently obliged to buy them off with tribute. The period of the Jan-kuo, or 'Three States,' into which the country was divided towards the close of Hân, about A.D. 184, is a favourite subject of the historical plays and romances of the Chinese. The leader of one of these 'Three States,' having at length obtained the sovereignty, established the capital in his own country Honân, and commenced a new dynasty. In consequence of the distractions which had arisen from women and eunuchs interfering in affairs of government during the period of the 'Three States,' a kind of salic law was passed, that 'queens should not reign, nor assist in public matters,' and accordingly we meet with no female sovereigns in their history. On the conclusion of this race of monarchs, in A.D. 416, China became divided into two principal kingdoms, Nanking being the capital of the southern one, and Honân of the northern. For about 200 years afterwards, five successive races (Woo-tae) rapidly followed each other, and the salutary rule of hereditary succession being constantly violated by the strongest, the whole history of the interval is a mere record of contests and crimes. At length, in A.D. 585, the north and south of modern China were united for the first time into one empire, the capital of which was fixed at Honân. The last of the five contending races was soon after deposed by Ly-yuen, who in A.D. 622 founded the dynasty of Tâng. There is reason to believe that certain Christians of the Nestorian church first came to China about this time. It is recorded that foreigners arrived, having fair hair and blue eyes. According to the Jesuits, whom Du Halde has quoted, a stone monument was found by them in Shen-sy, with the cross, an abstract of the Christian law, and the names of seventy-two preachers in Syriac characters, bearing the date of A.D. 640. The dynasty of Tâng was put an end to by a powerful leader in the year 897, and the whole country was thrown into a state of war and confusion, with several aspirants to the sovereignty. This period, which lasted about fifty-three years, is principally distinguished by the incursions of the Tartar people at the eastern extremity of the Great Wall, who, being encouraged by the unsettled and divided state of the country, gave great trouble by their inroads. After a succession of civil wars, Tae-tsoo, the first emperor of the Soong dynasty, was raised to the throne by the military leaders, A.D. 950. The art of printing having been just previously invented (about 500 years before it was known to us), the multiplication of books became a principal cause of the literary character of the age of Soong. The Chinese however being much less warlike than learned, the eastern Tartars advanced apace; they took possession of a part of northern China, and threatened the whole country. They were destined soon to be checked, not by the Chinese, but by the Mongols, who inabhited the countries which extend from the north-western provinces of China to Tibet and Samarcand. They had already conquered India, and being now called in against the Kin or eastern Tartars, they soon subdued both them and the enervated Chinese, whom they had been invited to protect. The Mongols might be said to be masters of the northern part of modern China from the middle of the thirteenth century. Kublai Khan, finding himself possessed of the provinces bordering on the Wall, with Peking for his capital, sent his army against the last sovereign of the Soong dynasty, then a child. Little or no resistance was offered to the Tartars, who exercised great cruelty on the vanquished. The remains of the Chinese court betook themselves to the sea near Canton, and perished with the emperor, A.D. 1281. Notwithstanding the great qualities of Kublai Khan, which were calculated to lay the foundation of a permanent dominion, his successors of the Yuen race, as they are called, by their rapid degeneracy caused the empire to pass out of the hands of the Mongol race in a little more than eighty years' time. Enervated by the climate and vices of the south, they quickly lost the courage and hardihood which had put the country in possession of their ancestors; and Shun-ty, the ninth emperor in succession, was compelled to resign the empire to a Chinese. The new sovereign, who commenced the native dynasty of Ming, A.D. 1366, selected Nanking as his capital, erecting Peking into a principality for one of his younger sons, Yoong-lo. When this prince succeeded as third emperor of his family, the capital was finally transferred (A.D. 1408) to Peking; a principal reason perhaps being the necessity of keeping in check the Eastern Tartars, who had been joined by some of the refugees among the expelled Mongols. From this union sprung the Manchows, who were destined at length to expel the Chinese dynasty, and establish a permanent Tartar dominion. In the year 1618, Wan-liĕ, the thirteenth emperor of the Chinese dynasty, being on the throne, a war commenced with these Manchows: and the empire passed in 1644 to Shunchy, the first of the Ta-tsing race, of whom the sixth emperor is now reigning. Such is the brief summary of the principal revolutions in the history of this antient empire, which for nearly two centuries past has been governed by a foreign race, who had the sagacity to adopt the political and social system of a nation which so greatly out-numbered themselves.

Arts, &c.—Whatever may be the actual antiquity of the Chinese people, no doubt seems now to exist of their having been the authors of what are justly considered in Europe as three of the most important inventions or discoveries of modern times: the art of printing, the composition of gunpowder, and the magnetic compass. To these may be added two very remarkable manufactories, of which they were unquestionably the first inventors, those of silk and of porcelain. There cannot be the least doubt of the art of printing having been practised in China during the tenth century of our era. The precise mode in which they operate is certainly different from ours, but the main principle, that of multiplying and cheapening books, by saving the time and labour of transcription, is altogether the same. The invention of powder, as compounded of 'sulphur, saltpetre, and willow-charcoal,' is carried back by the Chinese to a very remote date; but its particular application to fire-arms seems to have been European. The Chinese name has no reference whatever to guns, and simply implies *fire-drug*, which seems to show that the composition was applied by them merely to fire-works (in which they excel at present) and other harmless or useful purposes, long before their unwarlike spirit could have suggested the use of guns to themselves, or they could have borrowed the notion from Europe. With regard to the compass, the attractive power of the loadstone had been known to them from remote antiquity, but its property of communicating polarity to iron is for the first time explicitly noticed in a Chinese dictionary finished in A.D. 121. Under the head of 'Loadstone' appears

this definition: 'A stone with which a direction can be given to the needle.' The same word (*chin*) is used by them to express the magnetic and the common working-needle, as among ourselves. Père Gaubil, in his History of the Tâng dynasty, states that he found, in a work written one hundred years later than the above, the use of the compass distinctly recorded. It is curious to contrast inventions of such high utility and importance with the very small progress which the Chinese have made in the sciences, as astronomy, geography, and mathematics, for which they were not ashamed to be indebted to the European missionaries. With regard to the fine arts, or those which minister rather to the pleasures than to the wants of mankind, it becomes necessary to make some allowances for the peculiarities of national taste. The arts of drawing and painting do not rank so high among the Chinese as among ourselves in Europe, and having therefore met with less encouragement they may be expected to have made less progress. In drawings where perspective is not very strictly required, as in representations of birds, insects, fruits, and flowers, they are eminently successful, and nothing can exceed the splendour and variety of their colours. In regard to the Chinese music, their instruments are mostly tuned in unison, and they have little or no idea of accompaniment. They have certain characters to express the name of every note in their very limited scale, and these they use in writing down their airs; but whether this mode of notation is indigenous, or whether they obtained it from the Jesuits, in imitation of the European method, is doubtful. It is indeed stated that the Emperor Kâng-hy was much surprised when Père Pereira pricked down the Chinese tunes as they were played, and repeated them afterwards. Their instruments are numerous, consisting of different species of lutes and guitars; flutes and other wind-instruments; an harmonicon of wires, touched with two slender slips of bamboo; bells and pieces of sonorous metal; drums, and a sort of clarionette which emits as nearly as possible the tones of the Scottish bagpipe.

Literature and Language.—The antiquity of Chinese literature is proportionate to that of their language, and has been of course greatly promoted and increased by the early invention of the art of printing, which they have now possessed for 900 years. Specimens of this literature in various departments have been afforded to Europe by the labours of Staunton, Davis, Morrison, Klaproth, and Rémusat, who followed up the earlier investigations of the Jesuits at Peking, and have enabled us to form a judgment regarding the merits of compositions, which for a long period were considered to be inaccessible, from the difficulties of the language in which they were written. In legislation, we possess a translation of the Penal Code of the empire; in politics and morals, the sacred books of Confucius and his followers; and, in Philology and Belles Lettres, we have a copious and well-executed dictionary of the language; several translations or abstracts of histories; the Dramas of the 'Heir in Old Age,' the 'Sorrows of Hân,' 'Le Cercle de Craie;' an elaborate treatise concerning their poetry; and the excellent novel or romance of the 'Fortunate Union.' The mastery which has thus been obtained of the language of China by several Europeans, among whom our own countrymen hold a conspicuous place, seems to prove that the rumoured difficulties attendant on its acquisition, from the alleged number and variety of the characters, are the mere exaggerations of ignorance. We may close this article with giving some account of so singular and original a language from Davis's work on China.

It appears that the theory of a universal medium for the communication of ideas, as conceived by Bishop Wilkins, has been realized by the Chinese. While the letters of our alphabet are mere symbols of sounds, the Chinese characters or written words are symbols of ideas, and alike intelligible to the people of Cochin-China, Japan, Loo-choo, and Corea, with those of China itself. As the best practical illustration of a written character, common to several nations who cannot understand each other's speech, Mr. Davis adduces the Arabic numerals common to all Europe. An Englishman, who could not understand what an Italian meant if he said *venti-due*, would comprehend him immediately if he wrote down 22. This advantage, which belongs to our numerals only, pertains to the whole language of the Chinese. The uniformity however in the written character does not prevent the existence of great diversities in the oral languages of the neighbouring countries and China, and even of the separate provinces of the latter country. These diversities are precisely analogous to the different pronunciation given to the same numeral characters in the various countries of Europe. To adduce the foregoing example, the number 22, which an Italian calls *venti-due*, a Frenchman pronounces *vingt-deux*, and an Englishman *twenty-two*, though all three write them just alike. It is in this manner that the universality of the Chinese language extends only to the written character, and that the natives of the two extremities of the empire, who read the same books, and understand each other perfectly on paper, are all but mutually unintelligible in speech. The roots, or original characters of the Chinese, are only 214 in number, and might indeed be reduced to a much smaller amount by a little dissection and analysis. These are combined with each other to form other words, or express other ideas, very much in the same way that the individual Arabic numerals are combined to express the infinite varieties of numbers. By a species of analogy they may be called the alphabet of the language; with the difference that exists between an alphabet of ideas, and an alphabet of sounds. To assert that there are so many thousand characters in the Chinese, is much the same thing as to say that there are so many thousand words in Johnson's Dictionary; nor is a knowledge of the whole at all more necessary for every practical purpose than it is to get all Johnson's Dictionary by heart, in order to read English. Prémare observes, 'that there is nobody who might not read and write Chinese, after he had once acquired a good knowledge of 4000 or 5000 characters or words." The roots already mentioned serve, like our alphabet, for the arrangement of the words in the large Chinese Dictionary, a national work compiled by the most learned persons in the empire, more than a century since, by order of the enlightened monarch Kâng-hy. So ingenious and lucid is the arrangement, that to a practised person there is little more difficulty in turning to a word than, among ourselves, in consulting Johnson. From the principle on which the written language has been constructed, there has accrued to it a remarkable property noticed by the late professor Rémusat, in his paper 'On the State of the Natural Sciences among the People of Eastern Asia.' As the 214 roots, or radical characters, whose combinations with each other form the whole language, singly express or represent the principal objects or ideas that men have occasion to communicate in the infancy of their knowledge, they comprise within their number the heads of genera and classes in nature, and thus afford the elements and means of a philosophical system of arrangement. As their knowledge increased, a fortunate instinct (M. Rémusat observes) guided the framers of the written language, and led them, instead of forming characters altogether new, to express new objects by the ingenious combination of those elementary symbols which they already possessed. Among the roots, for instance, we find *horse, dog, metal*, the addition to which, of some other significant symbol, expressive of some peculiar property or characteristic, serves to designate the different species comprised under their principal genera.

In this manner, as M. Rémusat remarks, each natural object becomes provided with a binary denomination, inasmuch as the complex character is necessarily formed of two parts; one for the class, order, or genus: the other for the species or variety. Thus they express horse,—horse-ass—horse-mule; dog—dog-wolf—dog-fox; metal—metal-silver—metal-iron, &c. &c.—the elementary or generic words, horse, dog, metal, being those under which the compounds are arranged in the Dictionary. Much consideration is attached by the Chinese to the graphic beauty of their written characters. The advantage of simplicity constitutes the merit of our alphabetic writing: but that of variety and picturesque effect must fairly be claimed by the Chinese; as well as the peculiar characteristics of a universal medium of communication. The two most usual forms of their character are the printed and the written, besides which, there are the seal, or engraved form, and one or two others. The printed form (analogous to our Roman type) lays claim only to clearness and accuracy; but the written combines correctness with elegance. It may suffice to observe generally, that the grammar of the language is extremely limited. In the absence of all inflexion, of which their characters are utterly incapable, the relation of words to each other in a sentence can only be marked by their position. The verb, for instance, must always precede its object, and follow its agent. The plural

number is denoted by the affix of mun to nouns—jin-mun, men; t'ha-mun, they; or by repeating the noun, as jin-jin, men. Either of these is rendered unnecessary when a specific number is prefixed, as san jin, three men. The genitive or possessive case is commonly marked by an affix, che, succeeding the noun like our 's, as T'hien che gen, 'heaven's favour—shoo che ken, 'the tree's root.' The comparison of adjectives is marked by affixes, as haou, 'good'—keng haou, 'more good'—ting haou, 'most good.' The tenses of verbs are denoted by auxiliaries, or expletives, as t'ha yew tso, 'he has done.' The cases of nouns and pronouns are determined by prepositions, as tsoong t'hien, 'from heaven.' The collocation of words in a sentence must of course be a matter of more consequence in Chinese than in those languages where the relations of different words to each other are marked by the distinctions of number, gender, case, and person, as shown by declension and conjugation. The *Notitia Linguæ Sinicæ* of the Jesuit Prémare may be recommended as the best Chinese Grammar ever written.

As before the arrival of the Europeans China was frequently divided into two or three states, the northern portion of it was called by the adjacent nations of Central Asia *Cathay*, and under this name it became known to the Russians and Mongols, whilst the inhabitants of India called the southern part *Chin*, under which name the Portuguese and other Europeans became acquainted with it. In the seventeenth century, and not before, it was ascertained that Cathay was China, and that the great town of Cambalû was identical with Peking. (Du Halde; Staunton; Lindsay; Davis's *China*; Ritter's *Asia*.)

CHINA-WARE. [PORCELAIN.]

CHINCHI'LLIDÆ (Zoology), a small natural family of Rodent (gnawing) animals, to which the attention of English naturalists was first called by Mr. Bennett, from whose writings the principal part of this article is compiled.

Order. RODENTIA.

Tribe. Herbivora. F. Cuvier.

Molar teeth without true roots, growing throughout life by means of a persistent pulp.

Family. *Chinchillidæ*. Bennett.

Upper incisors simple; molars, $\frac{4-4}{4-4}$, consisting of two or three tænial or riband-like bony lamellæ or plates, parallel with each other, entirely surrounded with a vitreous substance; the crowns exactly opposite to each other and flattened by attrition. The posterior limbs nearly twice as long as the anterior. The tail produced with long and somewhat bristly hairs above and at the tip. The *chinchillidæ* are gregarious and subterranean in their habits, and mild in disposition.

Genera. Lagotis.

Dental formula: incisors, $\frac{2}{2}$, molars, $\frac{4-4}{4-4}=20$. The incisors are sharpened, and each molar consists of three complete oblique plates. *Skull* arched posteriorly and above; the superior cellules of the tympanum inconspicuous. All the feet four-toed, the great toe being entirely absent; nails long and subfalcular. Ears very long. Tail long. Fur soft, but caducous.

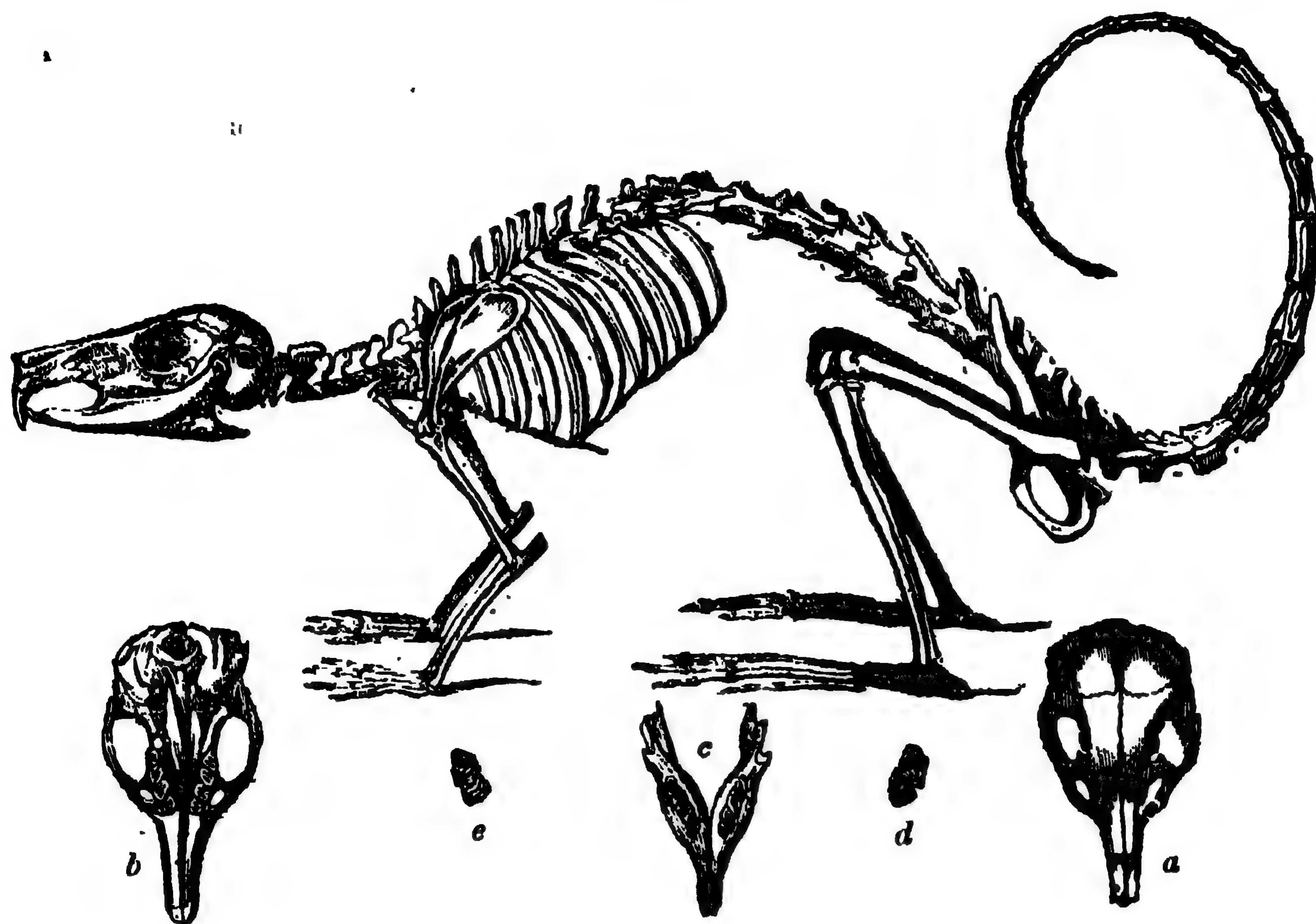
Example. *Lagotis Cuvieri*. Size, and much of the general form of the rabbit. Posterior limbs twice the length of the anterior: tail about equal in length to the body, excluding the head. Whiskers very numerous, closely set, jet black, ten or twelve of the longest on each side being exceedingly thick and rigid, and seven inches long. Ears nearly like a long parallelogram, rounded at the tip, three inches long and one broad, with the margins rolled in below, so sparingly furnished with short scattered hairs as to appear almost naked. Fore feet like the hinder, with four toes only, there being no vestige of a thumb; claws small, slightly sharpened, and entirely concealed by long and somewhat bristly hairs; those of the hinder feet similar in shape and rather larger, but that of the inner toe flattened, curved inwards, and exposed, the immediately adjoining hairs giving place to a tuft of about eight rows of short, stiff, horny, curved bristles, approaching nearly in rigidity to the comb-like appendage found in almost the same situation in the *Ctenomys Magellanicus* of Gray. A similar structure occurs in the *chinchilla*. The fur is beautifully soft, downy, and of considerable length, but so loosely attached to the skin that it readily falls off, unless handled with care. It is dusky at the base, and to within a short distance of the tip, where, for an extent of from one to three lines, it is dirty white, more or less tinged with yellowish brown. A few long black hairs, most numerous posteriorly, protrude through it. The general tone of colour is a mottled greyish ash. On the sides of the neck and body, where the tips of the fur merge more into yellowish-brown than on the back, and where they are also of greater length, as well as on the haunches and beneath, the latter tinge appears rather more predominant. There is little of the dusky colour visible on the under surface. The hairs of the tail below are extremely short, closely depressed, and of a brownish black; on its sides they are of two kinds, black and white; and this is also the case with the very long, rigid, and erectile hairs which form a crest along its upper surface. The very long, bristly hairs, which project in a tuft at the tip, are wholly black.

Mr. Bennett believes this species to be the *viscacha* of all the writers from Pedro de Cieça downwards, including Acosta, Garcilasso, Peter de Laet, Nieremberg, Feuillée, Ulloa, Vidauré, Molina, Schmidtmeyer, and Stevenson, who have stated that animal to be an inhabitant of the western or Peruvian acclivities of the Andes. M. de Blainville, Desmarest, and Lesson, are among the modern zoologists who have noticed the viscacha; Lesson, in his Manual, apparently confounding the eastern and western species, gives it as the *lepus viscaccia* of Gmelin, places it among the hares, and quotes Desmarest, as expressing his opinion in his 'Mammalogie,' that it ought to be the type of a new genus, under which the *chinchilla* might be perhaps arranged.

Cuvier, in the last edition of the 'Règne Animal,' says that the viscacha, as described by D'Azara, and according to the figures which he had seen and which were communicated to him by Mr. Brookes and Major Hamilton Smith, can scarcely be any other than a large species of chinchilla, with hair less long and soft; and he says that it is the animal described under the name of *Gerboise géante* (Giant Jerboa) by M. de Blainville in Desmarest's 'Mammalogie, and in the 'Nouv. Dict. d'Hist. Nat.,' and represented in the English translation of the 'Règne Animal' under that of *Marmot Diana*. Cuvier seems to be here speaking of the *Lagostomus* of Brookes, the other viscacha (of which we shall presently treat), and the *Dipus maximus* (*Gerboise géante*) of De Blainville, to include which and the chinchilla, M.M. Isidore Geoffroy St. Hilaire and Dessalines D'Orbigny had proposed in the 'Annales des Sciences Naturelles,' for November, 1830, the creation of a new genus—*Callomys*.

Mr. Bennett, in the concluding part of the first volume of the 'Transactions of the Zoological Society of London,' has recorded a second species, *Lagotis pallipes*. The fur of this, he observes, is perhaps even softer to the touch than that of *Lagotis Cuvieri*; a feel which is probably owing to its being less dense, on account of the comparative shortness of the hairs composing it; the fur of *Lagotis Cuvieri* imparting to the hand the sensation of fullness and consequent firmness, while that of *Lagotis pallipes* is yielding with its softness. The hairs in both species, especially those which form the mass of the fur, are wavy for the great part of their length, their tips only being straight: those of the middle of the sides measure, when their natural waves are not interfered with, three-quarters of an inch in *Lagotis pallipes*, and an inch and a quarter in *Lagotis Cuvieri*. In neither of these species, however, is the quality of the fur at all comparable to that of *Chinchilla lanigera*.

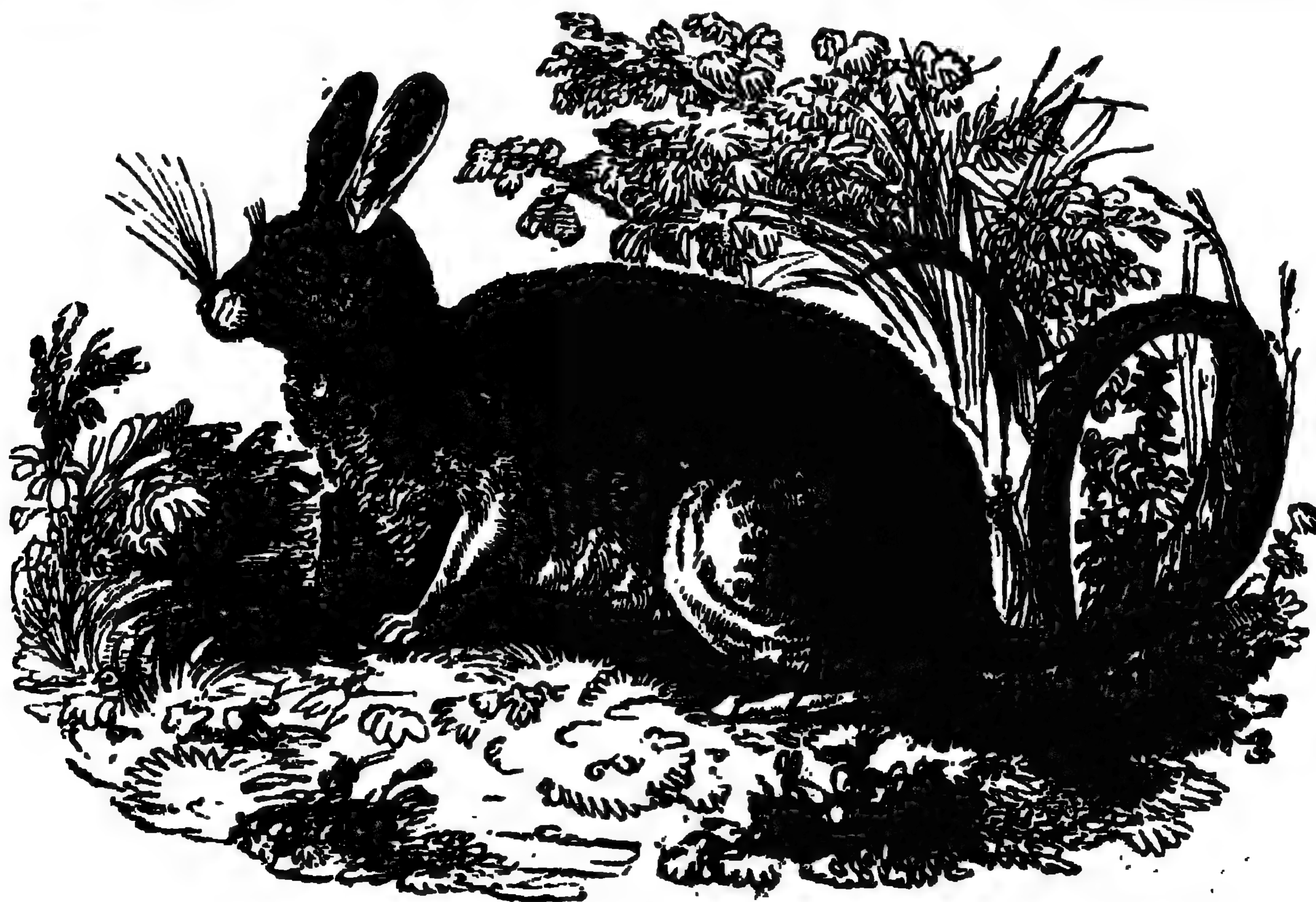
We have already observed that Mr. Bennett is of opinion that this species is the Peruvian viscacha of the authors above alluded to. The following is the English version (1709) of the passage in Pedro de Cieça's 'Chronica del Peru' (1554), descriptive of the habits of that animal:—'There is another sort of creature they call viscacha, about the bigness and resembling a hare, but that it has a long tail like a fox. These breed in stony places and among rocks, and many of them are shot with guns and crossbows, and taken by the Indians in gins (with the lasso), they being good to eat after hanging to tender; and of their hair or wool the Indians make large mantles, cloaks, or blankets, as soft as silk, and very valuable.' Ulloa's account (*Noticias Americanas*, 1772) is, in the opinion of Mr. Bennett (whose translation we adopt), the best history that has been given of its habits and manners. 'Taking the place of the rabbit, which is wanting in Peru, there is another kind of animal called viscacha, which is not found in Quito. In form, and in the colour of its fur, it is similar to the rabbit, but differs from it in having a long tail furnished with tufted hair (like that of the squirrel), which is very thin towards



[Skeleton of Lagotis Cuvieri *.]

a, skull seen from above; b, the same seen from below; c, lower jaw seen from above; d, crowns of the two anterior molar teeth of the lower jaw enlarged; e, crowns of the two posterior molar teeth of the upper jaw enlarged.

the root, but thick and long as it approaches the tip. It does not carry its tail turned over the head like the squirrel, but stretched out, as it were, in a horizontal direction; its joints are slender and scaly. These animals conceal themselves in holes of the rocks, in which they make their retreats, not forming burrows in the earth like rabbits. There they congregate in considerable numbers, and are mostly seen in a sitting posture, but not eating; they feed on the herbs and shrubs that grow among the rocks, and are very active. Their means of escape do not consist in the velocity of their flight, but in the promptitude with which they run to the shelter of their holes. This they commonly do when wounded; for which reason the mode of killing them is by shooting them in the head; as if they receive the charge in any other part, although much injured, they do not fail to go and die in the interior of their burrows. They have this peculiarity, that as soon as they die their hair falls off, and on this account, although it is softer and somewhat longer and finer than that of the rabbit, the skin cannot be made use of for common purposes. The flesh is white but not well flavoured, being especially distasteful at certain seasons, when it is altogether repugnant to the palate.' The author (supposed by some to be the Abbé Vidauré) of an anonymous Italian work on the natural history of Chile, extracts from which are given in the 'Journal de Physique' for 1779, has evidently confounded the eastern and western species; and his account, as Mr. Bennett well observes, is in several particulars apocryphal. Molina speaks of the employment of its wool among the antient Peruvians, adding, that the Chilians of the present day (his work was originally published in 1782, and reprinted with additions in 1810) use it in the manufacture of hats. Its burrows, according to the report of eye-witnesses, have two flats, communicating by a spiral staircase; in the lower it deposits its food, while it lives in the upper, which it seldom quits, except at night. It collects round the mouth of its burrow whatever has been left behind or lost by travellers: and its flesh, which is white and tender, is preferred to that of the rabbit or hare. But this account is liable to the same objections as that in the 'Journal de Physique.'.



[Lagotis Cuvieri †.]

Chinchilla.

Dental formula: incisors, $\frac{2}{2}$, molars, $\frac{4-4}{4-4}$ = 20, the molars generally consisting of three complete oblique plates, except the anterior lower molar, which has but two lamellæ, the anterior lamella being deeply bilobated. Skull posteriorly retuso-truncated, above depressedly flattened; cellules of the tympanum conspicuously inflated. Anterior feet five-toed: posterior feet four-toed, the nails small and

* From Mr. Bennett's figure, 'Zool. Trans.,' vol. i., part i.

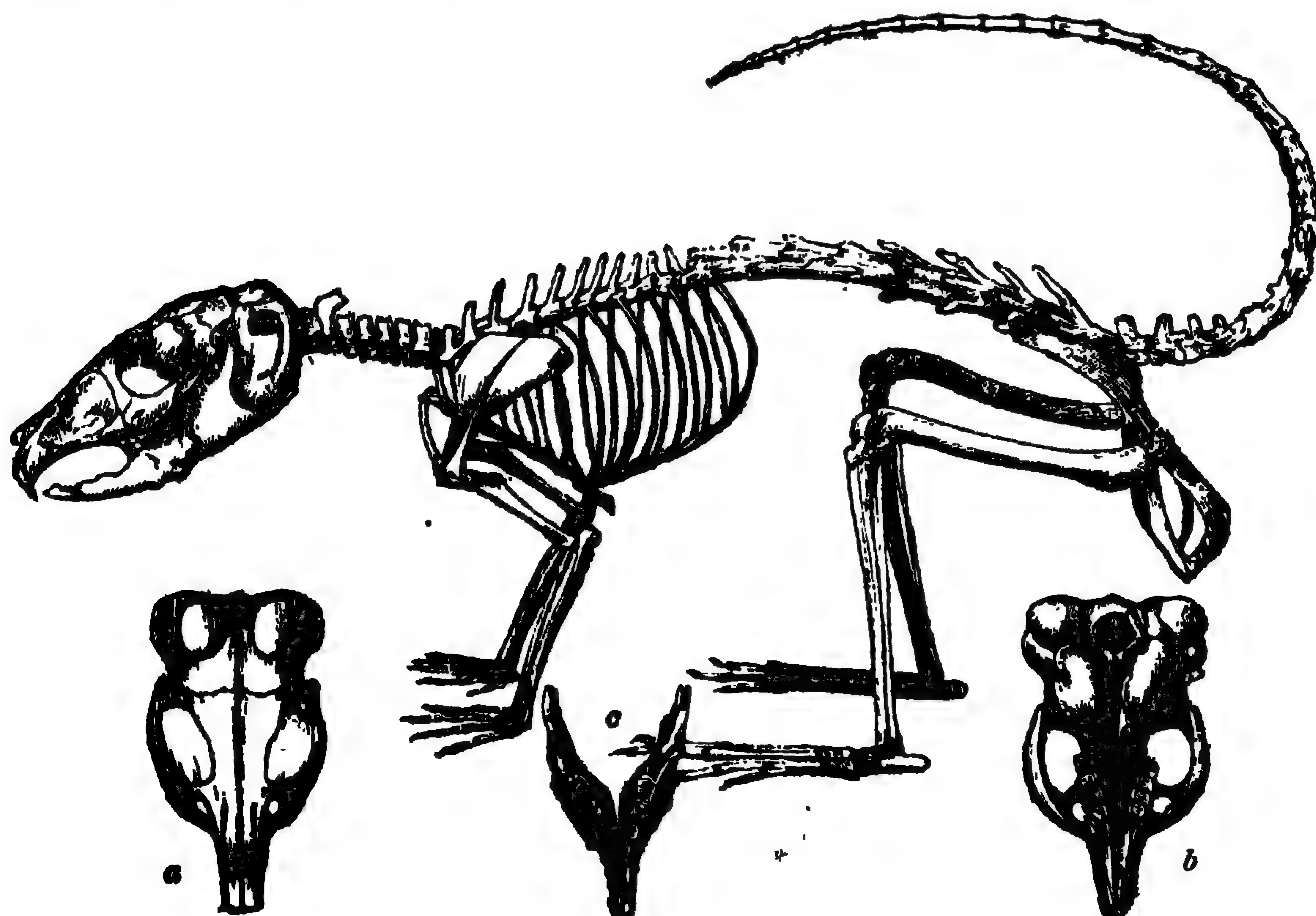
† From Mr. Bennett's figure.

subfalcular. The ears ample. The tail rather long. In addition to *Chinchilla lanigera*, which we select as an example, Mr. Bennett gives a second species, *Chinchilla aurea*, *Callomys aureus* of Isid. Geoff. St. Hilaire.

The length of the body of *Chinchilla lanigera* is about nine inches, and that of the tail nearly five. Its proportions are close-set, and its limbs comparatively short, the posterior being considerably longer than the anterior. The fur is long, thick, close, woolly, somewhat crisped, and entangled together, greyish, or ash-coloured above, and paler beneath. The form of the head resembles that of the rabbit; the eyes are full, large and black; and the ears broad, naked, rounded at the tips, and nearly as long as the head. The moustaches are plentiful and very long, the longest being twice the length of the head, some of them black and others white. Four short toes, with a distinct rudiment of a thumb, terminate the anterior feet; and the posterior are furnished with the same number, three of them long, the middle more produced than the two lateral ones, and the fourth, external to the others, very short and placed far behind. On all these toes the claws are short, and nearly hidden by tufts of bristly hairs. The tail is about half the length of the body, of equal thickness throughout, and covered with long bushy hairs; it is usually kept turned upwards towards the back, but not reverted as in the squirrels.' Such is the minute description of Mr. Bennett, who, in 1820, described the animal as the type of a distinct genus under its common name. Mr. Gray, in August, 1830, also described and gave an interesting account of its domesticated habits obtained from Mr. Hennah *.

Organization.—Mr. Yarrell, in February, 1831, gave to the Zoological Society of London the following account of the skeleton and parts of the *viscera* of one which died in the menagerie of the Society, premising that at the time of examination all the *viscera* had been preserved some months in a weak solution of spirit. 'The lungs are composed of three small lobes on each side. The heart is flattened in form from behind forwards, measuring $\frac{6}{10}$ths of an inch across its base, and but $\frac{4}{10}$ths in depth; the want of apex gives it a round and muscular appearance. The liver exhibits two large and equally sized lobes, and two smaller lobes. The stomach, a single cavity, measures from the entrance of the *œsophagus* round the great curve to the pyloric contraction five inches $\frac{1}{10}$ths, the greatest breadth 2 inches $\frac{3}{10}$ths, the depth, 1 inch $\frac{4}{10}$ths; the spleen is small and elongated. The length of the small intestines from the *pylorus* to the end of the *ilium*, 3 feet 10 inches; the *cœcum* and first portion of the *colon* are of large size; made up of three half circular convolutions, one central, with one of smaller dimensions on each outer side, containing numerous cells and divisions, strengthened by muscular bands and *septa*, the whole length of *cœcum*, *colon*, and *rectum*, measures 4 feet 10 inches. With the exception of the *cœcum* and commencement of the *colon*, which are voluminous, all the intestines are of very small calibre. The kidneys vary somewhat in shape; one measures $\frac{5}{10}$ths of an inch in length, and $\frac{3}{10}$ths in breadth; that on the opposite side is much more spherical. The specimen is female, and the uterine *cornua* measure each $3\frac{1}{4}$ inches in length.'

'Of the skeleton when mounted, the whole length, from the nose to the end of the tail, is 13 inches $\frac{6}{10}$ths; the upper surface of the *cranium* from the *occiput* to the inter-orbital space is triangular and flat, the width at the occiput 1 inch $\frac{1}{10}$th; of the inter-orbital space, $\frac{4}{10}$ths, the whole length of the head, 2 inches $\frac{2}{10}$ths; the mastoid processes and auditory cells of very large size; the external *meatus* also large, oval, directed upwards and backwards; the *zygoma* narrow and slender posteriorly, but deep and stronger at its junction with the malar bone, which has an ascending bony division between the orbits and temporal *fossæ*, the nasal bones narrow, convex, and of parallel diameter; the lower jaw is curved, broad, and strong; the course of the incisor teeth is visible, and the alveolar cavities of the molar teeth are well defined externally; the coronoid processes are wanting, apparently as if broken off during the preparation of the skeleton, but have obviously been of very small size; the condyle elongated from before backwards; the plate deep, and the posterior angle of considerable length. The exposed portion of the incisors measures $\frac{3}{10}$ths of an inch in length; the molar teeth are all made-up of three parallel portions, or bony *laminæ*, each portion invested with a thin coat of enamel, and closely united; the base of a molar tooth presenting six lines of enamel and three cavities; the anterior third of the first molar tooth on each side, above and below, is smaller than the other two portions, and gives to these teeth a triangular shaped crown; the posterior third portion of the last molar tooth on each side above, is nearly round, and gives an increase of surface to these also; in the molar teeth of the lower jaw the fold of enamel between the first and second portions of the bony *laminæ* of each tooth does not reach quite to the outer edge, and the two portions of bone appear therefore to be only partially separated. The direction of the parallel *laminæ* of all the molar teeth is not at right angles with the line of the maxillary bones, but inclining obliquely from without backwards. The length, from the *atlas* to the end of the tail, is 11 inches $\frac{4}{10}$ths; cervical



[Skeleton of Chinchilla lanigera †.]

a, skull seen from above; b, the same seen from below; c, lower jaw seen from above.

* Spicilegia Zoologica.

† From Mr. Bennett's figure.

vertebræ, 7; dorsal, 13; lumbar, 6; sacral 2, and caudal, 23. The *scapulæ* are small, measuring 1 inch from the external angle to the articulation with the *humerus*, the spine is but little elevated, the *acromion* ample, the clavicles perfect; length of the *humerus*, 1 inch $\frac{3}{10}$ths; the bone strong and furnished with an elongated crest descending from the head; from the *olecranon* to the carpal articulation, 1 inch $\frac{6}{10}$ths; the *ulna* and *radius* firmly anchylosed throughout the distal half of their length; thence to the longest of the five toes $\frac{8}{10}$ths of an inch. The ribs, 13 pairs. The bones of the *pelvis* slender and elongated; from the crest of the *ilium*, which is but little produced, to the inferior edge of the *ischium* is 1 inch $\frac{6}{10}$ths; the *ossa pubis* slight in structure, advancing but little; the *symphysis* elongated, and the *obturator foramen* of large size. The *femur* is straight, strong, and smooth, and measures 1 inch $\frac{8}{10}$ths; the *tibia* 2 inches $\frac{3}{10}$ths: the *fibula* is complete, and forms the external *malleolus*; from the *os calcis* to the end of the longest toe, 2 inches $\frac{1}{10}$th; the toes, four in number, of which the outer one is the shortest, the third from the outside, the longest; the second and fourth equal.'

Yarrell remarks that in some previously published observations, he had stated that the *Chinchilla* appeared to be closely allied to Mr. Brookes's *Lagostomus*, but that the more complicated structure of the teeth, and the existence of an additional toe on each of the feet, require for the *Chinchilla* the generic distinction claimed for it by Mr. Bennett and Mr. Gray. He adds that the resemblance of the skeleton to that of the *Jerboa* is also remarkable, particularly in the form of the head, in the excessive development of the auditory cavities, and the small size of the anterior extremities compared with the hind legs; and that the true characters of the Chinchilla 'seem even now to be unknown to the French authors above referred to*, who appear to be acquainted with its skin alone, and never to have examined either its teeth, or the number of its toes. In these respects it deviates from the characters of their proposed genus (*Callomys*); a genus which cannot be adopted, inasmuch as it is composed of heterogeneous materials, and as the two types included in it have both previously been described and designated as distinct groups.'

We now go back to Mr. Bennett's interesting account, in 'The Gardens and Menagerie of the Zoological Society delineated†,' of this animal, which that author observes, notwithstanding the extensive trade carried on in its skins, 'might have been regarded until the last year almost as an unknown animal.'

The earliest account cited by Mr. Bennett is an English translation (London, 1604) of Father Joseph Acosta's 'Natural and Moral History of the East and West Indies,' published at Barcelona, in Spanish, in 1591. 'The Chinchilles is another kind of small beasts, like squirrels; they have a woonderfull smoothe and soft skinne, which they (the natives) weare as a healthfull thing to comfort the stomacke, and those parts that have neede of a moderate heate.' Sir John Hawkins, in his 'Voyage into the South Sea, A.D. 1593,' (London, small folio, 1622, reprinted in 'Purchas his Pilgrims,') says, 'Amongst others they have little beastes, like unto a squirrell, but that he is grey; his skinne is the most delicate, soft, and curious furre that I have seene, and of much estimation (as is reason) in Peru; few of them come into Spaine, because difficult to be come by, for that the princes and nobles laie wait for them; they call this beast Chinchilla, and of them they have great abundance.' Alonso de Ovalle, in his 'Historical Relation of the Kingdom of Chili' (Rome, 1646), calls them squirrels. 'The squirrels (Ardas) which are found only in the valley of Guasco, are ash-coloured, and their skins are in great esteem for the fineness and softness of the fur.' An anonymous Italian author, supposed by some bibliographers —erroneously, as Mr. Bennett thinks—to be the Abbé Vidauré, who published at Bologna, in 1776, a 'Compendium of the Geographical, Natural, and Civil History of the Kingdom of Chili,' speaks of the Arda (Spanish for a squirrel) as a species of rat, or campagnol, of the size of a cat, found only in the province of Copaipo, moderately docile, and covered with ash-coloured wool, as close and delicate as the finest cotton. Buffon, and that too, after quoting Feuillée's excellent description, confounded it with the *Chinche*, the most stinking of beasts. D'Azara corrected this error, but falls into another himself, in regarding the chinche of Feuillée and Buffon as his Yagouaré. Molina (Natural History of Chili—Italian, Bologna, 1782) describes the Chinchilla as a species of Linnæan *Mus*, under the name of *Mus laniger*. Gmelin adopted the appellation, but M. Geoffroy St. Hilaire considered that it ought to be regarded as one of his *Hamsters*. Zoologists generally took up this opinion, and Molina, in a second edition of his essay (1810), seems to have entertained it. 'The Chinchilla,' says Molina, 'is another species of field-rat, in great estimation for the extreme fineness of its wool, if a rich fur as delicate as the silken webs of the garden spiders may be so termed. It is of an ash-grey, and sufficiently long for spinning. The little animal which produces it is six inches long from the nose to the root of the tail, with small pointed ears, a short muzzle, teeth like the house rat, and a tail of moderate length, clothed with a delicate fur. It lives in burrows underground, in the open country of the northern provinces of Chili, and is very fond of being in company with others of its species. It feeds upon the roots of various bulbous plants which grow abundantly in those parts; and produces twice a year five or six young ones. It is so docile and mild in temper that, if taken into the hands, it neither bites nor tries to escape; but seems to take a pleasure in being caressed. If placed in the bosom it remains there as still and quiet as if it were in its own nest. This extraordinary placidity may possibly be rather due to its pusillanimity, which renders it extremely timid. As it is in itself peculiarly cleanly, there can be no fear of its soiling the clothes of those who handle it, or of its communicating any bad smell to them, for it is entirely free from that ill odour which characterizes the other species of rats. For this reason it might well be kept in the houses with no annoyance, and at a trifling expense, which would be abundantly repaid by the profits on its wool. The antient Peruvians, who were far more industrious than the modern, made of this wool coverlets for beds and valuable stuffs. There is found in the same northern provinces another little animal with fine wool, called the Hardilla, which is variously described by those who have seen it; but as I have never observed it myself, I cannot determine to what genus it belongs.' Upon this, Mr. Bennett, whose translation we have given, remarks that there can be little doubt that this animal is identical with the Chinchilla, the latter being frequently spoken of by the name of Arda, the same with Harda, the diminutive of which is Hardilla. Schmidtmeyer ('Travels into Chile over the Andes,' London, 4to, 1824) thus describes the animal. 'The Chinchilla is a woolly field-mouse, which lives underground, and chiefly feeds on wild onions. Its fine fur is well known in Europe; that which comes from Upper Peru is rougher and larger than the Chinchilla of Chile, but not always so beautiful in its colour. Great numbers of these animals are caught in the neighbourhood of Coquimbo and Copiapo, generally by boys with dogs, and sold to traders who bring them to Santiago and Valparaiso, from whence they are exported. The Peruvian skins are either brought to Buenos-Ayres from the eastern parts of the Andes, or sent to Lima. The extensive use of this fur has lately occasioned a very considerable destruction of the animals.'

Captain Beechey, R.N., on his return from his expedition to the north-west coast of America, presented a living specimen to the Zoological Society; and an entire skin, rendered particularly valuable in consequence of its having the skull preserved in it, was at the same time brought home by Mr. Collie, the surgeon of Captain Beechey's ship, and deposited in the British Museum.

'To the account of its habits given by Molina,' says Mr. Bennett, 'we can only add, that it usually sits upon its haunches, and is even able to raise itself up and stand upon its hinder feet. It feeds in a sitting posture, grasping its food, and conveying it to its mouth by means of its fore paws. In its temper it is generally mild and tractable, but it will not always suffer itself to be handled without resistance, and sometimes bites the hand which attempts to fondle it when not in a humour to be played with. Although a native of the Alpine valleys of Chili, and consequently subjected in its own country to the effects of a low temperature of the atmosphere, against which its thick coat affords an admirable protection, it was thought necessary to keep it, during the winter, in a moderately warm room, and a piece of flannel was even introduced into its sleeping

* M.M. Isidore Geoffroy St. Hilaire and Dessalines D'Orbigny.

† Vol. i, 1830.

apartment for its greater comfort. But this indulgence was most pertinaciously rejected, and as often as the flannel was replaced, so often was it dragged by the little animal into the outer compartment of its cage, where it amused itself with pulling it about, rolling it up, and shaking it with its feet and teeth. In other respects it exhibits but little playfulness, and gives few signs of activity; seldom disturbing its usual quietude by any sudden or extraordinary gambols, but occasionally displaying strong symptoms of alarm when startled by any unusual occurrence. A second individual of this interesting species has lately been added to the collection by the kindness of Lady Knighton, in whose possession it had remained twelve months previously to her presenting it to the Society. This specimen is larger in size, and rougher in its fur than the one above described; its colour is also less uniformly grey, deriving a somewhat mottled appearance from the numerous small blackish spots which are scattered over the back and sides. It is possible that this may be the Peruvian variety, mentioned in the extract from 'Schmidtmeyer's Travels,' as furnishing a less delicate and valuable fur than the Chilian animal. It is equally good tempered and mild in its disposition, and, probably, in consequence of having been exhibited in a public collection, is much more tame and playful. In its late abode it was frequently suffered to run about the room, when it would show off its agility by leaping to the height of the table. Its food consisted principally of dry herbage, such as hay and clover, on which it appears to have thriven greatly. That of the Society's original specimen has hitherto been chiefly grain of various kinds, and succulent roots. When the new-comer was first introduced into Bruton Street, it was placed in the same cage with the other specimen; but the latter appeared by no means disposed to submit to the presence of the intruder; a ferocious kind of scuffling fight immediately ensued between them, and the latter would unquestionably have fallen a victim had it not been rescued from its impending fate: since that time they have inhabited separate cages, placed side by side; and although the open wires would admit of some little familiarity taking place between them, no advances have as yet been made on either side. Such an isolated fact can, of course, have little weight in opposition to the testimony of Molina, that the Chinchilla is fond of company. It is nevertheless a remarkable circumstance, and deserves to be mentioned in illustration of the habits of these animals.'

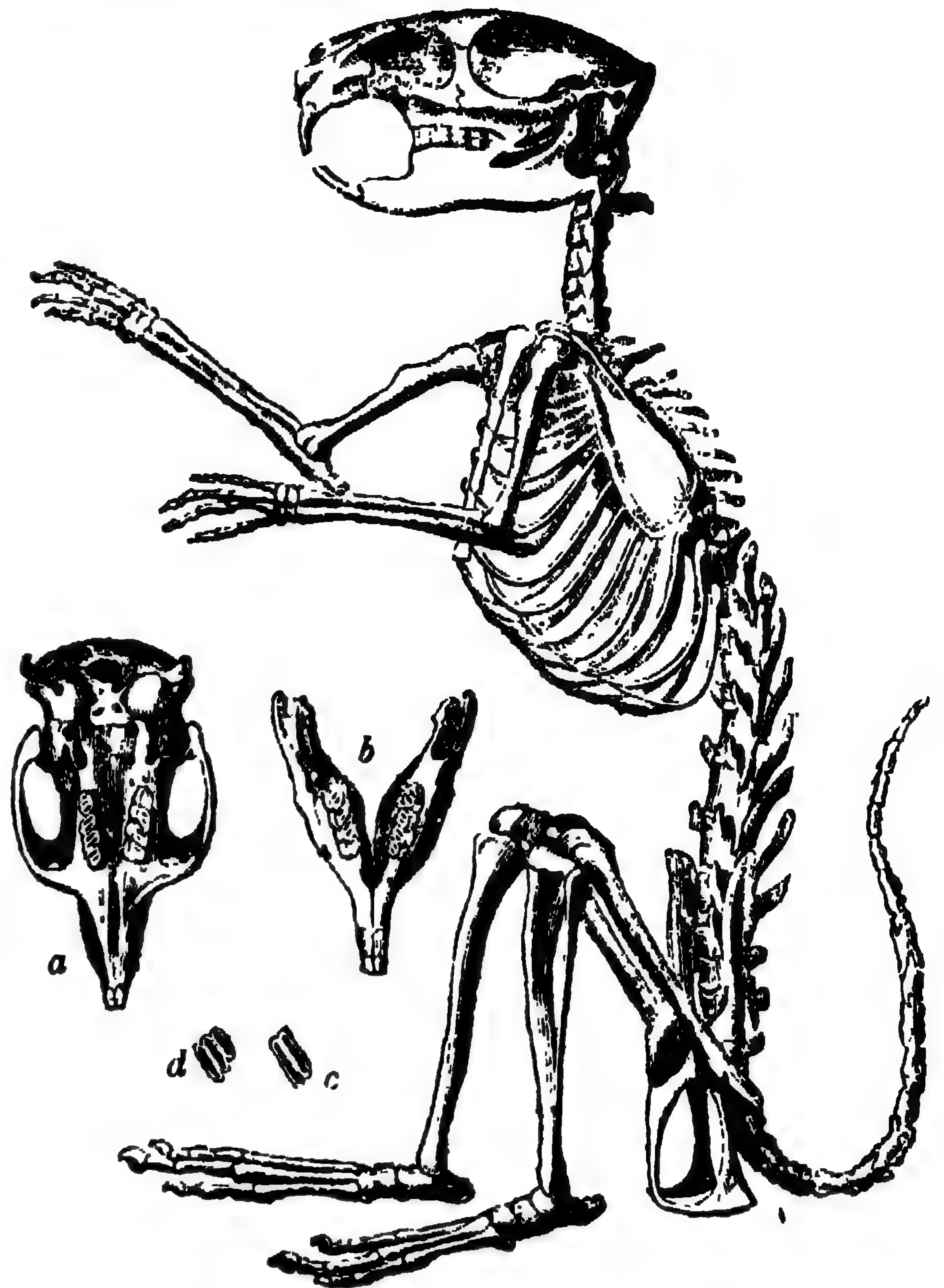
Utility, &c.—The fur is a considerable article of commerce. In muffs, tippets, linings to cloaks and pelisses, and trimmings for the same, it is sold extensively, and at a comparatively high price. There is now (August, 1836) a living specimen in the Garden of the Zoological Society, in the Regent's Park.



[Chinchilla Lanigera*.]

Lagostomus.

Dental formula, incisors, $\frac{2}{2}$, molars, $\frac{4-4}{4-4} = 20$. The incisors sharpened. The molars each consisting of two complete oblique lamellæ, the upper posterior one being trilamellar. Anterior feet four-toed, the thumb being altogether deficient, the nails small and falcular. Posterior feet three-toed, the nails produced, straight, and robust. Ears moderate. Tail moderate. Example. *Lagostomus trichodactylus*, Brookes.



[Skeleton of Lagostomus trichodactylus*.]

a, upper jaw; *b*, lower jaw; *c*, crown of the second molar tooth of the left side of the lower jaw; *d*, crown of the last molar tooth of the right side of the upper jaw.

In 1814 there was a living specimen of this animal at Exeter Change, where it was observed by M. de Blainville and M. F. Cuvier. The former described it in the 'Nouveau Dictionnaire d'Histoire Naturelle,' and the latter in the 'Dictionnaire des Sciences Naturelles,' under the name of *Dipus maximus*, Blainv., erroneously referring it to the Jerboas, and not suspecting its identity with the Eastern Viscacha, or Biscacho, an identity overlooked also by Mr. Brookes†, who obtained the specimen after its death, and prepared from it a stuffed skin and skeleton, which, on the breaking up of his museum, passed, according to Mr. Bennett's belief, into the hands of M. Temminck, who purchased them for the Leyden Museum. It had been figured, while living, in Mr. Griffith's 'Translation of the Règne Animal,' under the name of *Marmot Diana*, as before observed. MM. D'Orbigny, fils, and M. Isidore Geoffroy St. Hilaire, published in the 'Annales des Sciences' for November, 1830, a paper 'on the Viscacha and the Chinchilla, regarded as the types of a genus named *Callomys*, together with the description of a new species.' But M. Isidore Geoffroy has since seen reason to abandon his opinion of the generic identity of the two animals. In August, 1831, M. Lesson gave, in the 'Bulletin des Sciences Naturelles,' an extract from his 'Illustrations de Zoologie,' containing a new description of the Viscacha, under its original name of *Lagostomus trichodactylus*, which M. Kuhn had previously restored to the animal. The 'Illustrations' give a figure of the animal, and representations of its feet and of its muzzle.

Mr. Bennett is clearly of opinion that it is the Viscacha, described by so many travellers as colonizing the vast plains eastward of the great chain of the Andes. Dobrizhoffer, Jolis, D'Azara, Proctor, Head, Miers, and Haigh, all mention it. Capt. (now Sir Francis Head) gives a picture of these animals, sitting solemnly at the entrance of their burrows, quite in his peculiar style. Biscacho is the name he assigns to them, and, according to his account, the Bis-

* Goldfuss has figured it in his 'Naturhistorische Atlas,' under the name of *Lagostomus laniger* of Wagler, referring as a synonym to *Eriomys Chinchilla* of the Frankfort Museum.

* From Mr. Brookes's figure in the 16th vol. of the 'Linnæan Transactions.'

† 'Linn. Trans.,' vol. xvi., p. 95.

vachueras, or Biscacho burrows, which perforate the plains, are terrible traps for the unwary horsemen.

Habits.—We select the accounts of two foreign travellers (whose works are not in the hands of every one) of the habits of this species. 'The Biscacha, called by the Abipones Neheláterek,' says Dobrizhoffer in his curious *Historia de Abiponibus* (Viennæ, 1784), 'digs its burrows in the more elevated parts of the plains with so much art, that no aperture is left by which the rain can penetrate; and these burrows are divided into distinct settlements, numerous families inhabiting the same locality. On the surface of the ground are several entrances to the burrows, at which, towards sunset, they are seen seated in crowds, diligently listening for the sound of any person approaching. If everything remains quiet, they seek their food in the obscurity of the night, and commit grievous devastation on the neighbouring fields, devouring both wheat and Indian corn with extreme avidity, and when either is to be had, despising grass. For this reason the stations of the Biscachas are rarely to be seen in the desert plains, but indicate with certainty the near neighbourhood of the Spanish settlements. I have often wondered never to have seen the Biscacha in the territories either of the Abipones, or the Guaranis, although well supplied with all kinds of crops. They daily heap up, at the entrances of their burrow, dry bones, chips of wood, or whatever other refuse they may meet with, but for what purposes they collect such things it is impossible even to conjecture. The Spanish colonists amuse themselves with hunting them; pouring many buckets of water into their subterraneous retreats, until, to avoid drowning, the animals come forth into the plain, where, no means of escape being afforded them, they are killed with sticks. Their flesh, unless when very old, is not considered despicable even by the Spaniards.' The Abbé Jolis dwelt for twelve years in South America, and made three journeys into the remote districts of the interior. His work, 'Saggio sulla Storia Naturale della Provincia del Granchaco' (Faenza, 1789), is so little known, and his description, in some particulars, differs so much from that of Dobrizhoffer, that we give Mr. Bennett's translation of it. 'The Biscachas live in society, in burrows, under ground, which they form for themselves, excavating in all directions to the extent of a mile in circumference, with various exits and separate retreats, in which the old live distinct from the younger. The soil in which these are usually made is that which is hard and barren, and destitute of everything, but with bushes (boscaglie) at no great distance, and pasture of tender grass, roots, and the bark of trees. They collect around their retreats bones, dried leaves, and whatever they find in the neighbourhood: if anything is missing in their districts, it is to be found with certainty piled up in these situations the following day. As they are animals that avoid the light, having little power of vision, they are not to be seen in the day-time, unless at dawn, or towards evening after sunset. The night, and especially when the moon shines, is the proper time for seeking their food. Those among the Biscachas which are called Chinchillas, and which may be said to belong to the first species, inhabit only the mountains and cold situations; in size they are like a rabbit, and are clothed with a fine long fur. Their agility is surprising; they are seen leaping from rock to rock as if they had the faculty of flight. The others, indicated above, inhabit the level country, in warm situations..... Fierce and courageous, they defend themselves with all their might against the dogs, and sometimes even attack the legs of the hunters. I shall speak in my travels, as a fitter place, of the three curious modes in which they are driven out of their retreats; that is to say, with water, with fire, and by rubbing sticks together.'

But neither of those authors mentions the somewhat anomalous companions with which the Biscachos are associated, and we select, from the travels of Proctor, Head, Miers, and Haigh, the account of the first-named traveller, which, as Mr. Bennett observes, gives nearly all the particulars which are to be found in the rest. 'The whole country, from Buenos Ayres to San Luis de la Punta, is more or less burrowed by an animal between a rabbit and a badger, called the *biscacho*, which renders travelling dangerous, particularly by night, their holes being so large and deep, that a horse is almost sure to fall if he steps into one of them. The *biscacho* never ventures far from its retreat, and is seldom seen till the evening, when it comes out to feed, and hundreds may be observed sporting round their holes, and making a noise very similar to the grunting of pigs. Their flesh is much liked by the people, and they are remarkably fat, and on that account, when caught at any distance from their holes, are easily run down; they will however defend themselves from a dog a considerable time. The holes of these animals are also inhabited by vast numbers of small owls, which sit, during the day, gazing at the passing travellers, and making a very ludicrous appearance. The parts of the road most frequented by the *biscacho* are generally overrun by a species of small wild melon, bitter to the taste; whether it thrives particularly on the manure of the animal, or whether the *biscacho* chooses his hole nearer this running plant, does not seem to have been ascertained.'

In March, 1833, Dr. Meyen sent to the Imperial Academy Naturæ Curiosorum, the second part of a series of zoological observations, made during a voyage round the world, containing a revision of this family, for which he adopts from Wiegmann the name of *Lagostomi*, and to which he refers six genera; viz., *Pedetes*, *Lagostomus*, *Eriomys*, *Chinchilla*, *Galex*, and *Lagidium*; and he enumerates three distinct species of *Lagostomus*. His paper was published towards the end of 1833, in the 'Nova Acta Acad. Cæs. Nat. Cur.' His views differ widely from those of Mr. Bennett, which however we have retained, under the conviction that they are well founded, or, at least, unshaken by the observations of Dr. Meyen. As however confusion may arise from the discrepancy, we think it due to give Mr. Bennett's remarks on the paper in the last volume of the 'Zoological Journal.' 'As regards the South African genus *Pedetes*, Ill. (or *Helamys* of M. F. Cuvier),' says Mr. Bennett, 'I can by no means concur with the German zoologists who have proposed to associate it with the South American family of *Chinchillidæ*, although, as I have already stated in my paper in the Zoological Society's Transactions, p. 62, it seems in many of its characters to approach *Lagostomus*. I am still uncertain as to its true position, which I continue to think we are not yet furnished with sufficient materials to determine; but I am convinced that its relation to the *Chinchillidæ* is not one of near affinity.' 'The differences in the relative proportion of the limbs, in the elongated claws of its anterior extremities, in the character of its fur, and above all, in the structure of its teeth, forbid, as I have there stated, a close approximation.'

'The genus *Lagidium* of Dr. Meyen is synonymous with my *Lagotis*; and the species named by him *Lagidium Peruvianum* appears to be identical with *Lagotis Cuvieri*. The ascertainment of its habitat on the elevated plateaux of Peru confirms the accuracy of my decision, unassisted by any evidence as to locality, regarding its identity with the *Viscacha* of Peruvian travellers. Of its habits, as witnessed by himself in its native country, Dr. Meyen gives some interesting particulars. He states that it is most abundant just below the limits of perpetual snow, and does not form those extensive subterranean excavations so well known as the work of the *Viscacha* of Buenos Ayres; it was moreover invariably found among the rocks, and never on the level ground. On several occasions it was shot during the day, but was seen most frequently at sunset, being excessively abundant, although pursued with avidity on account of the good flavour of its flesh, which, however, is not so tender as that of the hare. The fabrication of stuffs from its wool, so general in the time of the Incas, has now entirely ceased; and such stuffs are only to be met with among the rarities found in the tombs of the antient inhabitants. Dr. Meyen further adds, that the skins of these Viscachas are brought to us through Buenos Ayres as an article of commerce, but are not so highly prized as those of the *Chinchilla*. He gives a figure of the animal, and good representations of its skull and teeth.' Mr. Bennett then proceeds to show that Dr. Meyen, as he had before observed, enumerates three species.

Of *Lagostomus*, the two first of these represent the animals respectively figured by the late Mr. Brookes and by M. Lesson, under the name of *Lagostomus trichodactylus*, which Dr. Meyen considers as distinct on account of the differences observable between the two figures. These consist in the small and curved claws of the hinder foot in the former, contrasted with the large size and nearly straight direction of the same organs in the latter; in the habit; and in the shape of the tail. The misapprehension may serve

to show how dangerous it is to rely on figures only in the discrimination of species. As regards the first presumed distinction, Mr. Bennett has observed (p. 57 of his paper), that 'in this particular the figures given by Mr. Brookes are defective, as exhibiting the claws far smaller and more curved than is natural.' A reference to the descriptions of M. F. Cuvier and M. de Blainville, both taken from Mr. Brookes's specimen while living, will confirm the accuracy of this observation; the latter in particular (Desm. *Mammal.* No. 508), describing the middle toe of the hinder foot as furnished with a very strong claw. On the second point, the habit, it need only be observed, that both figures were taken from stuffed skins by artists who had never seen the living animal; and who could consequently give only their own conjectural ideas of its natural appearance when in a living state. On the third, it may be observed, that some obscurity is to be feared, M. de Blainville having described the animal while living as having its tail truncate and mutilated, and Mr. Brookes's skin and skeleton being both provided with perfect tails. A fine skin, now in the possession of the Zoological Society, agrees in all essential particulars with the animal figured by M. Lesson; and as far as Mr. Bennett's recollection goes, with that which once formed a part of Mr. Brookes's Museum. The figure given by the latter should only be considered as correct in so far as it is borne out by the descriptions of MM. F. Cuvier and De Blainville, which should be referred to in connexion with it.

The third species of *Lagostomus*, enumerated by Dr. Meyen, is the *Eriomys Chinchilla* of Dr. Lichtenstein, figured and described in the 'Darstellung neuer oder wenig bekannter Säugethiere,' a work unknown to Mr. Bennett when his paper was published: and Mr. Bennett acknowledges that the figure there given so closely resembles the true *Chinchilla lanigera* in all its prominent features, that he should not have hesitated to refer it to that animal, had it not been accompanied by separate representations of the feet, which offer only four toes on the anterior, and three on the posterior extremities. Dr. Meyen, however, quotes as a synonym *Callomys laniger* of M. Isidore Geoffroy and the younger D'Orbigny; and Mr. Bennett, therefore, observes, that there can be little doubt that they overlooked the small and almost rudimental inner toe both of the fore and hind feet; the identity of this animal with the *Chinchilla lanigera* of Dr. Rousseau being unquestioned by the Parisian zoologists, who have ample opportunities of comparing them, and M. Geoffroy himself having subsequently admitted the generic distinction of the *Chinchilla* (his *Callomys laniger*) from his genus *Callomys*, the true *Lagostomus*. The *Chinchilla* of Mr. Gray, the fourth genus of the family, according to Dr. Meyen, being beyond question the only *Chinchilla* yet noticed by English zoologists, and consequently identical with that figured in Mr. Griffith's edition of Cuvier's Animal Kingdom, and Mr. Bennett's Chinchilla. The author last named sees no reason for doubting that the *Eriomys* of Vander Hoeven, Dr. Meyen's fifth genus, is founded on the same species.

Galea, Dr. Meyen's sixth genus, is founded on a skull discovered at the entrance of a burrow belonging, according to Mr. Bennett, in all probability to a yet undescribed species of the family *Chinchillidæ*; as the character of the animal inhabiting the burrow, which was only seen at a distance, appeared closely to resemble a true *Chinchilla*. The skull and teeth, however, observes Mr. Bennett, according to the figures, belong to the *Caviidæ*, with none of the known genera of which do they altogether agree, although they approach most nearly to *Kerodon*.

Mr. Bennett concludes by stating that Dr. Meyen's *Dendrobius Degus* is his (Mr. Bennett's) *Octodon Cumingii*, described in March, 1832; and he observes that Molina's description of his *Sciurus Degus* differed so greatly from the animals from which Mr. Bennett's description was taken, and which were living in the garden at the Regent's Park, in September, 1834, that he hesitated to quote that name as a synonym, adding that he is not quite sure whether Dr. Meyen states of his own knowledge or on Molina's authority, that his (Dr. Meyen's) animal is called *Degus* by the natives of Chile. If the former, the synonym, he remarks, can be of course no longer doubtful.

As dates are of consequence in an investigation of this nature, the following note to Mr. Bennett's paper on *Lagotis pallipes* is given:—'Dr. Meyen's paper was communicated to the Imperial Academy in March, 1833: mine was communicated to the Zoological Society in May of the same year. But the genus *Lagotis* had been characterized by me, so far as its external characters could be ascertained from the living specimen, at a meeting of the Committee of Science and Correspondence, in June, 1832; and the name then given was affixed, throughout the life of the animal, to the cage in which the Society's animal was kept.'

CHINESE ARCHITECTURE. The architecture of the Chinese may be considered unique in its style. Their buildings differ also in construction from those of Europe and the rest of Asia. The peculiar character of Chinese architecture is displayed in their royal palaces, their temples, bridges, triumphal arches, and also in their houses and sepulchres. The materials employed are wood, of which that most in use is the nan-mon, a kind of cedar: stone, marble, bricks, bamboo, and glazed or porcelain tiles are also employed. The construction of houses is directed by a public functionary, whom we may not inaptly designate a district surveyor. Every one is obliged to build his house according to his rank, and for every house a certain size and details are fixed. The ordinary habitations have one floor, and we may presume the houses of the common people in the towns to be crowded, and badly ventilated, since the police force the people to sleep in the open air during the dog-days, lest they should be suffocated. The houses called heou, that is of many floors, were once very much the fashion, and some were built about 211 feet high. Wooden columns, so placed as to support the roof, are common, and are from eight to ten diameters in height. They are fixed on stone or marble bases, but have no capitals; an architrave of wood placed on the top of them runs through the wall of the house, and a beam which is carried through the upper part of the column, and passes through the wall also, is connected with the architrave on the outside of the house. The roofs, which are slightly constructed of bamboo, are often double, and resemble one roof rising out of the other: they turn up at the eaves, at the angles of which are hung grotesque figures of dragons, &c. The columns and beams are often made of precious woods, and are inlaid with ivory, copper, and mother-of-pearl. Not the least singular appearance in a Chinese house is the door, which is often a complete circle; the window frames and sashes are formed of small pannels of various forms moulded out of clay, and neatly joined together. The sills of doors are of stone. The wood of the nan-mon is said to last more than a thousand years. Stone and marble, though in abundance, are more rarely used than wood, brick, and tile. The palaces of the kings are built on large masses of alabaster as a foundation. The palace of Pekin is on an immense scale, 2513 feet by 3235 feet. It is spoken of by the missionaries as presenting a very imposing appearance. The palace, which is divided into a number of courts, is composed of towers, galleries, porticos, halls, and immense buildings: each court is more superb than the other as you approach towards the last court, the residence of the king, which is the richest of all. In Pekin, and in the environs, there are said to be 10,000 temples: those which are within the walls of the palace are beautiful, and some are magnificent.

Almost all the temples differ in their plan. That of Honang presents as you enter, first, a very extensive court with three rows of trees which lead to an open vestibule, the ascent to which is by a step; this vestibule leads to another, in which are four colossal seated figures, formed of stucco; this last vestibule leads into another great court surrounded with colonnades and rooms behind them for the priests. The court contains three square temples, equidistant, and set upon a plinth along the centre of the court; they are two stories high, and surrounded with columns both above and below, and filled with idols. The priests perform their religious ceremonies in these buildings. At the four corners of the court are other smaller and somewhat similar edifices but without columns, in which the chief priests reside. Under the colonnades and between the rooms of the ordinary priests, there are four chambers occupied by idols. Two smaller courts are placed on each side of the centre of the large court; these are surrounded by the kitchens, refectory, and hospitals: all the buildings are covered with green varnished tiles.

The towers which we call pagodas are very common in China. The most celebrated is at Nankin, and is commonly called the Porcelain Tower. The plan is octagonal, with a diameter of 40 French feet, each face being 15 French feet wide; it has nine stories. There are others of round, square, and hexagonal forms, built of stone, brick, porcelain, and wood: each story has a roof and an elaborate balcony railing; at the angles of the roof beds are hung. The pagoda at Kew is a poor representation of a pagoda, having neither the colours nor brilliant decorations of the Chinese. It was built by Sir William Chambers.

Triumphal arches, erected to the honour of women as well as men, are very common; and there is a great rage for them in China. In the smaller towns they are built of wood, and the workmanship of many is very coarse. At Ming-po the triumphal arches have three gates, two small and one large, the larger one being in the centre. The door-posts are of stone. The entablature consists of three or four faces, and the architrave is morticed and tenoned, although it is of stone. Mouldings are seldom used in these faces, except in the highest or the highest but one; instead of a cornice there is a projecting roof which crowns the whole. The ornaments of some of these arches consist of men, birds, and flowers, and the ground is cut away so that the day-light is seen behind: the three openings are also arched. Most towns have extensive walls, high enough to hide the buildings, except the pagodas or towers, and wide enough to ride on horseback. The walls of Pekin, which are built of brick, are 42 feet 6 inches high, and they have small square towers at every 200 feet. In some places there are long inclined planes for the cavalry to ascend. The isolated castle of Tien-sing-foo, at the confluence of the Pei-ho and Eu-ho rivers, is of a square form and built of slate-coloured bricks; the walls are ramped or inclined inwards; the basement is of stone, and the entrance, which is arched with stones, is at some height from the ground, with a square window on each side. The top of the castle has battlements, and below them is a large torus-moulding on a level with the terrace; just above the torus are small semicircular arches to let the rain run off the terrace. The parapets between the battlements are each pierced with two small holes, and a small guard-house with the roof having the usual turned-up eaves is built on the top of the terrace.

The Chinese varnish their columns, colour their roofs, and plaster their walls with stained substances of brilliant colours. Ornaments in China are little more than mere flat cuttings out, like the laced railwork of their balconies. The Chinese roofs, which for their form are unique, are considered by some to have been derived from the tents of this people in their nomadic state.

The tombs and monuments of China exhibit a variety of architectural designs, often resembling the familiar forms of their buildings; even the double roof is carved on some mausoleums. The common people have only a cone of earth with trees on the summit, not unlike the barrows in Wiltshire. Several forms of tombs are given in Alexander's 'Costume of China.' The forms are round, square, hexagonal, and octagonal, and the form of the coffin is also imitated.

Chinese architecture does not appear to be founded on the best principles. As in all semibarbarous nations, outward show is the great object, and thus the brightest coloured houses are thought the most beautiful.

For a general account of Chinese bridges, see BRIDGE; and for the Great Wall, see CHINA, p. 74. (Alexander's *Costume of China*, and his drawings in the museum of the East India House; Sir William Chambers's *Architecture; Il Costume Antico e Moderno*, plates; the *Encyclopédie Methodique* contains a very long article on China.)

CHINGLEPUT, a tract of country forming part of the grants obtained by the East India Company in 1750 and 1763, from the Nabob of Arcot, and known in the annals of the Indian government as the Company's Jaghire. This tract is bounded on the N. by Nellore district; on the W. by the districts of northern and southern Arcot; on the S. by the southern division of Arcot; and on the E. by the bay of Bengal; it therefore forms part of the province of the Carnatic, and is included in the presidency of Madras.

The soil of the Chingleput district is generally bad; detached rocks of granite are continually met with in the fields, and interfere with the processes of cultivation. The district was invaded by Hyder Ali in 1768 and 1780; in the latter of these invasions the country was so ravaged that many parts were wholly depopulated, and for some years after presented to the view of the traveller only the ruins of houses and temples, and the bones of people who had been massacred. Shortly after this invasion the inhabitants of the less desolated parts experienced a famine which caused so considerable an emigration that nearly the whole country was deserted. In 1794 the district was formed into a collectorate under Mr. Place, and a gradual improvement took place, so that in 1823, according to returns made by the collector to the Madras government, the population amounted to 363,129 persons, of whom 190,243 were males, and 172,886 females. The principal towns in the collectorate are Chingleput and Conjeveram. Chingleput is situated in 12° 46′ N. lat., and 80° 2′ E. lon., on a stream which at a short distance west from the town falls into the Palaur. The town is distant 38 miles S.S.W. from Madras; it is irregularly built, and the houses are of mean appearance. The fort is of considerable extent, and has been of great strength; of late years it has been allowed to go into decay, and is garrisoned by a few invalids. In 1751 it was taken by the French under Dupleix, and in the following year was retaken by a small detachment under captain, afterwards lord Clive.

Conjeveram, called by the natives Kunji, is situated in a fertile valley watered by the small river Wegawutty, in 12° 49′ N. lat., and 79° 48′ E. long. The town is built in a straggling manner, and resembles a series of villages interspersed with extensive gardens and plantations. The streets, which are wide and regularly laid out, are planted on each side with cocoa-nut trees and bastard cedars. The houses are only one story high; they have mud walls and are roofed with tiles. Each house is built in the form of a square, with a small court in the centre. The buildings extend for between five and six miles; round the whole is a hedge of the Agave Americana, which has been found useful as a defence against irregular troops. A considerable part of the inhabitants are weavers, and employ themselves in making red handkerchiefs, turbans, and cloths adapted for the dresses of the natives. Conjeveram is also the residence of numerous Brahmins belonging to temples dedicated to Siva and Vishnu, which are much frequented. The pagoda of Siva is a large building said to contain 1000 pillars, many of them elaborately sculptured. The pagoda dedicated to Vishnu Conjee is not so large, but is more highly venerated. It was from this building that the town obtained its name of Conjeveram. There are many other pagodas, dedicated to various Brahminical deities. There are large tanks near to the different pagodas; for one of these, lying on the west side of the great pagoda, it is said the gods collected water from three millions of rivers. Every Brahmin who visits the place for the first time must perform his ablutions in this tank, and spend money in charity; the sums thus raised being in fact applied to the support of the Brahmins belonging to the temple.

(Mill's *History of British India*; Buchanan's *Journey through Mysore, Canara, and Malabar*; Heyne's *Historical and Statistical Tracts on India*; *Report of Committee of Commons on Affairs of India* 1832.)

CHIO'NEA (Dalman), a genus of Dipterous insects belonging to the section *Tipulariæ terricolæ*.

Only one species is yet discovered of this genus, but this is remarkable both in its structure and habits. It is less than half an inch in length; the head is of a brownish-yellow colour; the thorax and abdomen are ashy-brown; the latter is of an oval form and rather hairy; the legs are very long, rather thick and covered with hairs, not unlike the legs of a spider, and of a yellowish colour. It is perfectly destitute of wings, and is found upon the snow in the woods of Sweden throughout the winter. The generic characters are:—Body apterous; joints of the palpi nearly equal; antennæ setaceous, ten-jointed, and covered with fine hairs at the extremity; the abdomen of the male terminated by a forcep-like appendage composed of two horizontal jointed processes, and that of the female is terminated by a boring instrument, or ovipositor, consisting of two valvules, placed one upon the other, of which the upper one is the longer, and composed of two plates.

Upon turning to the article Boreus, it will be found that there is another insect which, though it belongs to a different order (*Neuroptera*), resembles this species in its habits of appearing during the winter, and crawling upon the snow, as well as in being apterous, a character which is of rare occurrence in either tribe.

CHIOS, called by the modern Greeks, Khio, and by the Italians, Scio, is an island of Asiatic Greece, near the W. coast of Asia Minor. It faces the peninsula of Clazomenæ and Erythræ, which is formed by the gulf of Smyrna on the N., and that of Samos on the S. Chios lies at the entrance of the Gulf of Smyrna, and is separated from the main land by a channel about 8 miles wide. Its length from N. to S. is about 30 miles, and its greatest breadth about 10. It is mountainous, especially in the N. part, the principal summit of which, called Mount Pelinæus, consists of a long line of bare rocks. Strabo reckoned 400 stadia from the N. extremity of Chios to the nearest point of Lesbos. The oldest settlers, according to tradition once current in the island, were Pelasgi from Thessaly. Chios was afterwards one of the twelve Ionian states founded by the European colonists from Greece; the population that settled there was not pure Ionian, but mixed. (Strab. 633. Herod. i., 142.) The dialect of the inhabitants is said by Herodotus to have been the same as that of the people of Erythræ. In the great sea-fight between the Ionian Greeks and the Persians, (B.C. 494) which resulted in the entire defeat of the Greeks, the people of Chios furnished 100 ships, and fought bravely. After the battle the Persians took possession of the island, which suffered in nearly the same way that it has again suffered in our own time: the cities and temples were burnt, and all the handsome young females carried off.

The principal towns of the island in antient times were Chios, Posidium, Phanæ, which had a good port and a temple of Apollo, Notium, Elæus, and Leuconium. Ion, the dramatic writer, the historian Theopompus, and the sophist Theocritus, were natives of this island. Chios was also one of the places that claimed Homer as a native.

After the close of the Persian war, B.C. 480, the island passed successively under the dominion of the Athenians, the Macedonians, the Romans, and the Byzantines. The Genoese took it in 1346, and it was governed for a long time by the Genoese family of Giustiniani. Solyman the Great took it in 1566. In 1694 it was taken by the Venetians, but was soon after retaken by the Turks, by whom it was treated with especial favour, being allotted as a kind of dowry to the Sultana mother, who sent her officers to collect the mastic gum which is found in great abundance in the S. district of the island, and which constitutes a valuable commodity, being much used at Constantinople, and especially by the ladies of the seraglio for chewing. Under the protection of the Sultana mother, the people of Chios were safe from the vexations of the pashas and other arbitrary chiefs; they had their own magistrates, and lived in comparative freedom and security. The island accordingly prospered, and Tournefort, Dr. Chandler, Olivier, and other travellers, agree in representing it as a garden inhabited by a happy people. Its inhabitants amounted to more than 100,000, of whom nearly 30,000 lived at Khio, the capital, a handsome town built in the Italian style, with a castle raised by the Genoese, on the E. coast of the island. Khio is at the foot of Pelinæus, and occupies the site of the antient town of Chios. It had a college with fourteen professors, in which between 400 and 500 youths of the various Greek islands received their education, a printing-office, and a good library. The establishment was supported by voluntary contributions of the Chiote merchants, many of whom were wealthy, and carried on an extensive commerce with Italy and other countries.

Chandler speaks with rapture of the beauty and the simple graceful manners of the young females of Chios, at the time of his visit. When the Greek insurrection broke out, the Chiotes, a peaceful race, and far from the theatre of war, remained quiet, until a party of turbulent Samiotes and other Greeks from Candia, half partizans, half pirates, landed upon the island in 1822, and excited or rather obliged the people to join the insurrection. The sequel is well known. The capadan pasha came with a large force, the Samiotes escaped by sea, the poor Chiotes made hardly any resistance, but were slaughtered by thousands, their wives and children were carried away and sold as slaves, and the town was burnt. A traveller who visited the island in 1828 describes the melancholy appearance of that once thriving and beautiful place. 'We walked through long streets that contained nothing but the ragged skeletons of houses, and heaps of fallen masonry; grass, weeds, and nettles were growing in the crevices of the marble halls, in the ruined churches, in the but lately busy streets; and to give an idea of the utter desolation of this once populous town, we started a covey of partridges in the Strada dei primati, or principal street. In the town and the villages of the island there were at that moment about 15,000 Greeks who had escaped from the slaughter and had returned under the assurance of protection of the new Pasha Jussuf, the scanty remnant of a population of 100,000.' (Macfarlane's *Constantinople in* 1828.)

The wine of Chios is celebrated as among the best in the Levant, and it had the same reputation in the time of Strabo. The island produces also cotton and silk, besides fruit in abundance. A great number of tame partridges are bred on the island. Marble quarries are mentioned by Strabo as being worked; and Chandler speaks of a marble quarry near the town of Khio.

CHIPPENHAM, a parish, parliamentary, and municipal borough, and market town, in the hundred of Chippenham, Wiltshire, on the Bristol Avon, 86 miles west from London. The parish contains about 6900 acres, being upwards of six miles in length from east to west, and varying in breadth from one to two miles. The parliamentary borough, which returns two members, was extended under the Reform Act, and includes the parishes of Chippenham, Hardenhuish, and Langley Burrell, and an extra-parochial district which was formerly the forest of Chippenham. The population of the parish in 1821 was 3506; in 1831, 4333: of the extended borough, in 1831, 5270. The population of the town is estimated at about 1700. Under the Corporations Reform Act, the municipal borough has four aldermen and twelve councillors, but is not divided into wards.

Chippenham is an ancient town, but it was not incorporated till the reign of Mary. Its name is derived from its market, for which it has been long famous. The Avon is not navigable for several miles below Chippenham; but a branch of the Wilts and Berks canal is brought into the town from a distance of about two miles, by which a considerable trade, principally in coals, is carried on. A great traffic also arises from the town lying on the London and Bristol and Bath road. The great western railway will pass within a quarter of a mile of the market-place.

The market has recently been changed from Saturday to Friday, and a handsome building, called the Market-House, (over which is an extensive room, used for public meetings), has been erected by Joseph Neeld, Esq., at present (1836) one of the members for the borough. There is a monthly market for the sale of cattle and cheese: four annual fairs, for cattle and horses, are also held; and during the present year (1836) wool fairs have been established.

The town has recently been lighted with gas and paved, under an Act obtained in 1834. With the exception of some very dilapidated buildings in the centre of the town, the houses are generally well built, either with freestone or brick.

There are two manufactories, one for woollens, and the other for silks, at present at work: the latter is of recent establishment, but the former has been for many years the staple fabric of the town: the number of manufactories in that branch was formerly considerable, but for several years their number declined, and has been now reduced to one.

A savings' bank was established in 1822, which, on the 20th of November, 1835, held the sum of 22,521*l.* A literary and scientific institution has recently been set on foot.

A court of requests, for the recovery of debts not exceeding 40*s.*, is held here every six weeks; its jurisdiction extends over the hundreds of Chippenham, Damerham North, and Calne. The living of Chippenham is a vicarage, with the rectory of Tytherton Lucas annexed, in the gift of Christ Church, Oxford. In addition to the church, (a venerable Gothic edifice, almost in the centre of the town), Chippenham contains four chapels, not connected with the establishment.

A bridge over the Avon, and certain causeways in the neighbourhood, are kept in repair by the corporation, who some years since widened the bridge at a considerable expense; it is well paved and lighted.

A free school, for the education of twelve poor children, is (with other charities) under the management of the corporation; the stipend allowed to the master by the foundation is 5*l.* 15*s.* per annum, with a residence. There is a daily and Sunday school for poor children (which is well attended), in connexion with the National School Society, and there are also Sunday schools in connexion with the various dissenting chapels. A trifling endowment for a Sunday school for the instruction of girls in the principles of the church of England was left in the year 1724, by the Rev. Robert Cock, vicar of the parish, who, by his will, gave the whole of his property to trustees for that purpose. A monument is erected to his memory in the chancel of the church. There are several other charities.

Some mineral springs have been found in the vicinity of Chippenham.

The antient abbeys of Stanley and Lacock are within three miles of Chippenham; the former is converted into a farm-house, but the latter has fallen into the hands of the Talbot family, who have preserved, and made it their family seat.

The antient forest of Chippenham and Pewsham is destroyed, although the latter place is still provincially called 'the Forest,' and the roads leading from it to the town retain the names of Wood Lane and Timber Street.

A union, under the Poor Law Amendment Act, has been formed of Chippenham and twenty-eight surrounding parishes, comprising a population, according to the census of 1831, of 19,265 persons, and an area of 56,371 acres. (*Communication from Chippenham*, &c.)

CHIPPEWAYS. [CREEKS.]

CHIROCEPHALUS. [BRANCHIOPODA.]

CHIRONECTES. [LOPHIADÆ.]

CHIRO'NOMUS, a genus of Dipterous insects of the family *Tipulidæ*. This genus was established by Meigen, and is principally distinguished by the following characters:—Fourth joint of the palpus longer than the rest; antennæ thirteen-jointed, in the male, and furnished with long hairs; the antennæ of the female are six-jointed, and the hairs are short; the anterior legs are inserted at some distance from the others, and the anterior tarsi are generally very long; the wings when closed lie parallel and they have three posterior cells; the body is long, slender and hairy.

Mr. Stephens, in his catalogue of British insects, enumerates upwards of eighty species of this genus: they are all of small size, frequent marshy situations, and very much resemble gnats. The worm known to anglers by the name of blood-worm is the larva of one of the species of this genus—the *Chironomus plumosus*. This worm is about half an inch in length; the body consists of numerous segments, and is furnished at the tail with several appendages which constitute the breathing apparatus. It is seen during the summer months on the mud near the edges of ponds and ditches; when thus seen however it is only shifting from one place to another, its natural locality being in the mud, where it may generally be found in great numbers, living for the most part under water. This larva is much sought after and devoured by birds and fishes; but during this last summer (1836) we discovered that it had a very formidable enemy in an insect of its own order. A fly, which closely resembled the house-fly, was observed in great abundance on the mud which had just been left by the retiring water, and we found them assembled in little groups of five or six, in the act of extracting the blood-worms from their holes, using the proboscis for this purpose; but no sooner was the worm fairly dislodged than a battle ensued, for each apparently wished to have the worm to itself; those that kept possession sucked out the fluids from the worm.

The pupa is of a brownish colour; the body is cylindrical, the head, thorax, wings, and legs are inclosed in separate sheaths, and, with the exception of the two fore-legs, lie in a close and compact mass; the fore-legs, covered by their sheaths, project from each side of the thorax. In this as well as in the larva state, the animal lives in the water. The breathing apparatus consists of two appendages, one on each side of the thorax, and each is composed of five branches which spring from a common centre.

When the insect is ready to quit its pupa case, it gains the surface of the water, and there remains suspended for some little time* with the disc of the thorax slightly protruded; this part bursts down the middle, and the insect, which is hairy, and hence does not easily wet, places its feet upon the surface of the water, where it floats (if the weather be calm) with the greatest safety. We observed, upon taking one upon our finger, that the wings are at first opaque and white, and filled with a fluid; but in a minute this fluid was expelled, and the sides of the wings collapsed and became transparent. The fluid thus ejected we perceived on our finger beneath the insect, but could not ascertain from what part of the wing or body it made its escape.

The perfect insect is of a pale ash colour, and is a little larger than the common gnat, which it resembles. This, as well as others of the genus, is remarkable for its habit of carrying the two fore-legs in a horizontal position: they project in front, and might be mistaken for antennæ; these latter organs however are very beautiful, and in the males resemble litle plumes.

CHI'ROTES, a genus of Saurians separated by Cuvier, and, according to him, resembling the *Chalcides* in their verticillated scales, and the *Amphisbœnæ* still more, in the obtuse form of their head; but distinguished from the first by their want of posterior feet, and from the last by their possession of anterior limbs. The same author adds, in a note to the last edition of the 'Règne Animal,' that the genera which terminate this order of Saurians are interposed in various manners between the ordinary Saurians and the genera which are placed at the head of the order Ophidians to such a point, that many naturalists are now of opinion that the two orders ought no longer to be separated, or rather that one order should be established, comprising on the one part the Saurians, with the exception of the *Crocodilidæ*, and on the other the Ophidians of the family *Anguidæ*; but he observes that there exist, among the fossil forms of the antient calcareous beds, two very extraordinary genera (*Ichthyosaurus* and *Plesiosaurus*), which, with the head and trunk of a Saurian, have feet attached to short limbs and formed of a multitude of small articulations conjoined so as to form a kind of paddle or fin, like the anterior paddles or fin-feet of whales. These ought, he adds, to form a very distinct family. In their osteology they approach the Saurians, properly so called, much nearer than the crocodiles, with which Fitzinger associates them in his family *Loricata*, though in the fossils there is no trace either of scales or of the tongue, the two parts on which the characters of the *Loricata* rest.

These Bimanous reptiles, as Cuvier terms them, include, according to him, but one species, which is a native of Mexico. This is the *Bimane cannelé* (*Chirotes canaliculatus*) of Cuvier, *Bipède cannelé* of Lacépède, *Chamæsaura propus* of Schneider, and *Lacerta lumbricoïdes* of Shaw. The animal has two short feet with four toes on each (and the vestige of a fifth) sufficiently organized internally, and attached by means of *scapulæ*, *clavicles* and a small *sternum*; but the head, the vertebræ, and, in short, all the rest of the skeleton resemble that of the *Amphisbœnæ*.

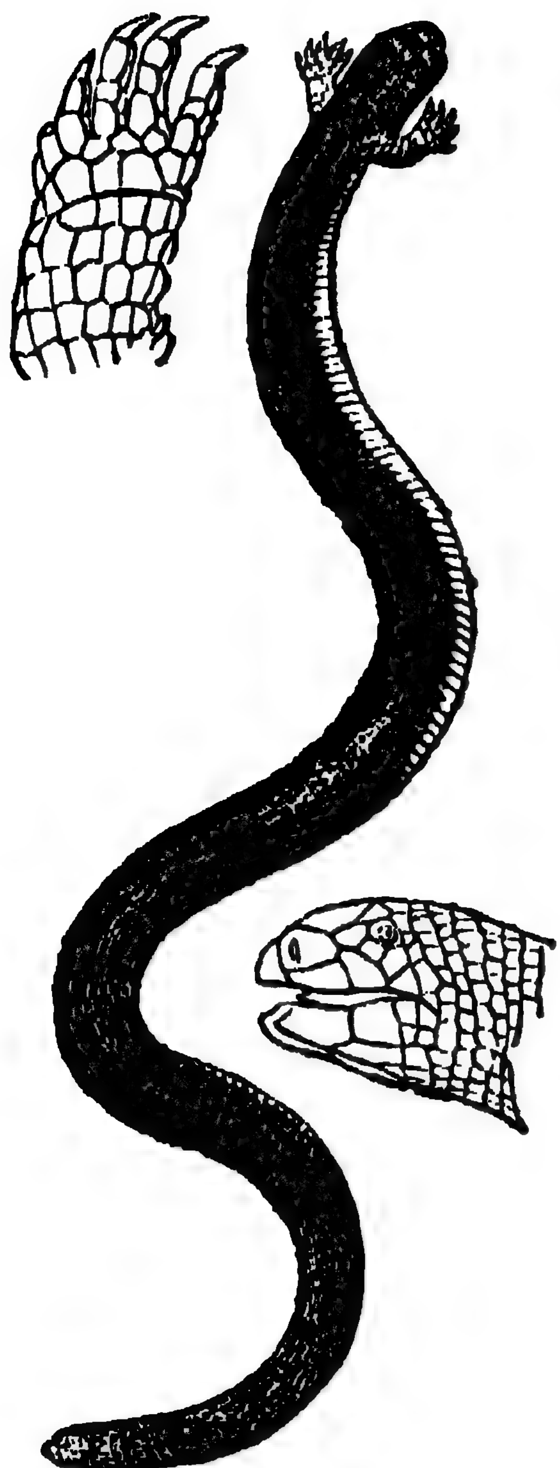
Chirotes canaliculatus is about the size of a human little finger, and from eight to ten inches long (French). It is of a flesh-colour and covered with about 220 demi-rings on the back, and as many under the belly, which meet, in alternating, on the side. The tongue is but little extensile and is terminated by two small horny points. The eye is very minute. The tympanum is covered with skin and invisible externally. Above the vent are two lines of pores.

* Discussions have arisen on the means which this animal possesses of suspending itself at the surface of the water without motion, its specific gravity being supposed to be greater than water.

Messrs. Kirby and Spence account for it by a kind of propelling power which the centre of the thorax possesses, and state that this part being thus protruded and drying, the attraction of the air to the dry portion of the thorax is sufficient to overcome the slight difference in the specific gravity between the animal and the element; but it is further stated that if a drop of water fall upon the insect at this time it will immediately sink.

We have kept these insects in a glass jar for the purpose of observing their habits, and are very much inclined to doubt that the specific gravity of the pupa is greater than that of the water at the time just previous to the transformation from pupa to the imago state. Indeed at this time it appeared that they could not keep *from* the surface, unless they were in motion. Whenever we approached the jar, being at the top, they immediately descended by a quick zigzag movement of the body; but upon our remaining quiet for a moment they ceased all motion and rose to the surface again. We imagine that at this time the animal within having become partially disengaged from the pupa case, the space between the two is filled with air, that this would be sufficient to overcome the difference of specific gravity between the animal and the water, and that there would most probably be more air in the region of the thorax than elsewhere; and hence this part is protruded from the water.

Cuvier says that he only detected one large lung and the vestige of a small one, as in the majority of serpents.



[Chirotes canaliculatus.]

CHI'RUS, a genus of fishes of the section *Acanthopterygii*, and family *Gobioides*. The species of this genus have the body considerably elongated, furnished with ciliated scales, and the mouth not deeply cleft; the teeth are small and conical, but the most remarkable character consists in the body being furnished with several longitudinal lines of pores, similar to the ordinary lateral line. Some of the species have appendages over the eyes, as observed in the *Blennies;* their ventral fins have each five soft rays: the spines of the dorsal fin are slender, and this fin extends nearly the whole length of the back.

Cuvier says that it is with hesitation that he places this genus with the family above-mentioned, and that it will probably one day form the type of a separate family. All the species as yet discovered inhabit the seas of Kamtschatka—they are included in the genus *Labrax* by Pallas, who describes several of the species in the 'Memoirs of the Academy of St. Petersburgh,' vol. ii., 1810.

CHISMOBRANCHIATA (Zoology), De Blainville's second order of his second sub-class, *Paracephalophora Monoica*. The following is his definition of the order. *Organs of respiration* aquatic, branchial or pectinated, situated at the anterior part of the back, in a large cavity communicating with the ambient fluid by a wide oblique anterior slit. *Mouth* toothless, but provided with a long lingual riband-like organ. *Shell* either none, or internal, or external, very much depressed, with a very large entire aperture, and without any pillar (*columella*).

This definition is incorrect, in so far as it states that in some instances there is no shell; for *Coriocella*, the only genus described by De Blainville as being without any shell, has a horny one, as Cuvier observes, though it is very delicate and flexible, and nearly membranous. Cuvier, who places three of the genera, *Sigaretus*, *Coriocella*, and *Cryptostoma*, under his *Capuloides*, a family of his order *Gasteropoda pectinibranchiata*, observes that De Blainville places the greater part of the *Capuloides* under his non-symmetrical *Hermaphrodite Paracephalophora*, or *Calyptracians;* but that they appear to him (Cuvier) to be all Diœcious.

The geographical distribution of this order, which, according to De Blainville, is marine and probably herbivorous, is wide.

Genera.—Coriocella.

Body elliptical, very much depressed, having the borders of the mantle very delicate, notched in front, and spreading out very largely on all sides. *Foot* oval, very small. *Head* scarcely distinct; two *tentacula*, hidden under the shield, of some size, but short and contractile. *Eyes* at the external base of the *tentacula*. *Back* somewhat rounded, and according to De Blainville—but this, as we have already seen, is an error—without any shell, external or internal.

Example.—*Coriocella nigra*, Blainv. The only species of the genus, and described by De Blainville from a specimen in his collection. Locality, Seas of the Isle of France. Cuvier places this and the two following genera under his *Gasteropoda pectinibranchiata*.



[Coriocella nigra.]

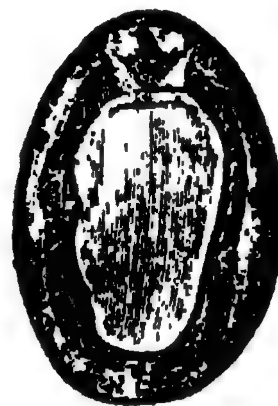
Sigaretus.

Shell more or less thick, flattened, with an ample and round aperture and but little spire, the whorls of which increase very suddenly; and enveloped during life in a spongy shield, which considerably encompasses its borders as well as the foot, and which is the true mantle. In front of this mantle there is a notch and a demi-canal, which serve to conduct the water into the branchial cavity. The tentacula are conical, and the eyes are placed at their external base. The male organ, according to Cuvier, is very large.

De Blainville thus subdivides the genus:

a. Species with a very delicate and smooth shell.

Example.—*Sigaretus convexus.*



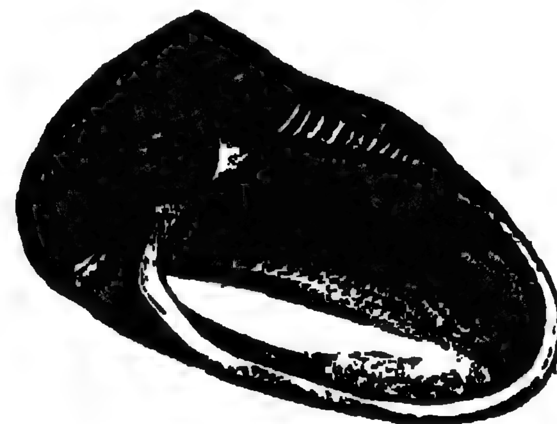
[Sigaretus convexus, seen from below.]



[Sigaretus convexus, side view.]

b. Species with a thick and solid shell.

Example.—*Sigaretus haliotoideus.*



[Sigaretus haliotoideus.]

De Blainville observes that only a few living species of this genus are known. Mr. G. B. Sowerby, admitting that he has but a slight acquaintance with it, judges it to belong to the same family with Lamarck's *Bullæa Aplysia*, and *Dolabella*, though Lamarck has placed it among his *Macrostomata*, near to *Haliotis*, evidently on account of its general form and its dilated aperture. G. B. Sowerby further observes, that he knows not why Lamarck has arranged *Nerita cancellata* of Chemnitz with *Sigaretus* rather than with *Natica*, and remarks that much confusion seems to reign in Lamarck's synonymy of his *Sigaretus haliotoideus*, inasmuch as he quotes figures of several very distinct shells for it.

Sigaretus has been found at depths varying from five to fifteen fathoms on sandy bottoms.

Fossil Sigareti.

Defrance enumerates three fossil species, one from the

Plaisantin, one from Grignon, and another from the environs of Bourdeaux. G. B. Sowerby says that the fossil species are few and rare, and that they occur in the London clay at Barton, and in the contemporaneous formations in France and Italy. The species in the Calcaire grossier at Grignon, he adds, has a small umbilicus. Deshayes in his 'Tables' gives eleven living species, and four fossil (tertiary); one, *Sigaretus depressus*, living in the seas of the Molucca islands. The fossils occur in the Pliocene, Miocene, and Eocene periods of Lyell.

Cryptostoma.

Shell very like that of Sigaretus, carried with the head and abdomen, which it covers, upon a foot four times its size, cut almost squarely behind, and which produces anteriorly a fleshy and oblong part, which makes nearly one-half of the mass. The animal itself has a flat head, two tentacula, and a large pectinated branchia on the *plafond* of its dorsal cavity. The male organ is placed under the right tentaculum.

Example.—*Cryptostoma Leachii.*



[Cryptostoma Leachii.]

De Blainville, who separated the genus, says that he knows two species, both from India, and adds, that perhaps some species of Lamarck's *Sigaretus* belong to them. G. B. Sowerby, who identifies *Cryptostoma* with *Sigaretus*, states that as far as the differences in the shells themselves warrant it, his opinion is decidedly against the separation of De Blainville's *Cryptostoma* from the latter genus; and adds, that he does not think the animals sufficiently different to render the propriety of separating them very clear. He afterwards says, 'Upon examination of the specimens in the British Museum, we are convinced that De Blainville's *Cryptostoma Leachii* is the same as one of the two shells which Adanson calls *Sigaret*: his *Crypt. breviculum* is probably the other; but this we cannot ascertain, because the shell has been taken away from the specimen in the British Museum. We have no doubt, however, that the *Crypt. breviculum* of De Blainville is a female specimen of Cuvier's *Sigaretus*, given by him to Dr. Leach. It is to be regretted that Cuvier has not given any description of the shell of his *Sigaretus*, so that it is impossible to ascertain whether or not it be identical with either of Adanson's shells; it is perhaps needless to add, that unless it can be identified with one of them, it ought not to be considered as a *Sigaretus*. Its animal is certainly very different from that of *Cryptostoma Leachii*, which we believe to be identical with one of Adanson's.' Cuvier, in the last edition of the 'Règne Animal,' retains De Blainville's genus *Cryptostoma*, and places it next to *Coriocella*. He adds in a note, that besides the species in the British Museum (*Cryptostoma Leachii*, Blainv.), he possesses another (*Cryptostoma Carolinum*, Cuv.), sent from Carolina by M. L'Herminier. The genus does not appear in Deshayes's list.

Oxynöe.

Body gastropod, with a large dorsal shell, anterior, bulliform, and with a simple spire. *Foot* narrow. *Branchiæ* marginal, striated transversely. *Mantle* widened into two lateral wings. *Tentacula* two, not retractile.

Example.—*Oxynöe olivacea.* De Blainville, who seems to consider this genus somewhat apocryphal, observes that he only knows it from the little that Rafinesque, who described it in the 'Journal de Physique,' says of it; and adds, that he only places it in the position given to it, because M. Rafinesque states that it only differs from *Sigaretus*, because the shell is external; adding that, nevertheless, if the *branchiæ* are disposed, as Rafinesque describes them, the difference must be much greater. Rang, who speaks with approbation of this remark by De Blainville, places it under his unclassed genera. Cuvier does not notice it.

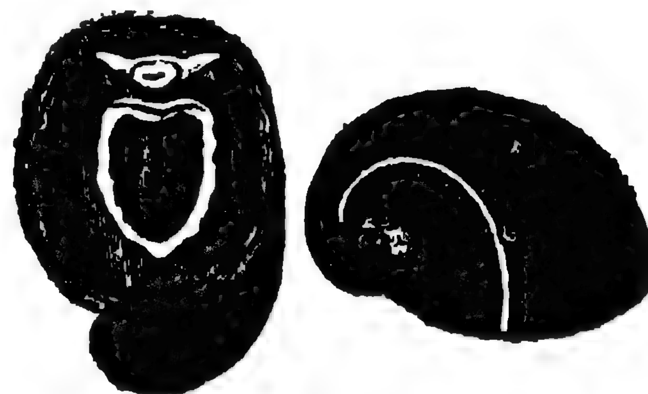
The next genus in De Blainville's arrangement is *Stomatella*, but as he places *Stomatia* with the sea-ears, and as we agree with G. B. Sowerby that *Stomatia* and *Stomatella* do not differ sufficiently for generic distinction, the reader will find their description under Haliotidæ.

Velutina.

Animal oval, sufficiently protuberant (bombé), hardly spiral; border of the mantle simple anteriorly, and double for the whole of its circumference; the internal lip thickest and tentacular. *Foot* thick. *Tentacula* large, obconical, distant, with a small frontal veil between them. *Eyes* black, sessile at the external side of the base of the tentacula. *Mouth* large, at the extremity of a sort of muzzle. *Respiratory cavity* large, without any trace of a tube, and containing two unequal pectinated *branchiæ*; orifice of the ovary at the base of the male organ, situated at the root of the right tentaculum. Muscular attachment of a horseshoe shape, very slight behind and open before.

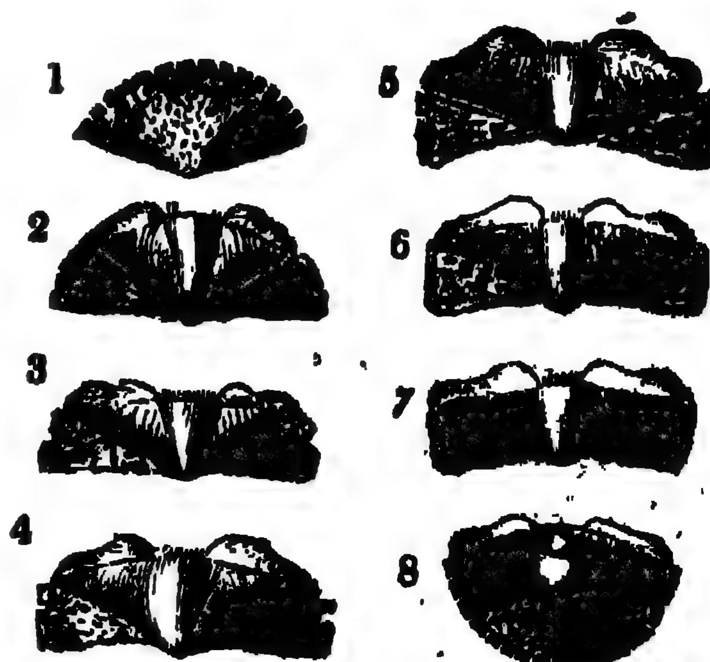
Shell, external with an epidermis, patelliform, with a small lateral spire, and without a columella. Aperture large, the edges almost continuous, and sharp: the right border united to the left by a lamellar calcareous deposit.

Example.—*Velutina capulöidea*, *Helix lævigata*, Linn. De Blainville observes that he established this genus from an individual provided with its shell, which he owed to the generosity of Defrance. He adds that he knows but one species from the coast of England, which is very probably the same of which Müller speaks under the name of *Bulla velutina*, and which Lamarck erroneously regarded as the analogue of his *Sigaretus haliotoideus*; and that Mr. Gray has also proposed the genus under the same name.

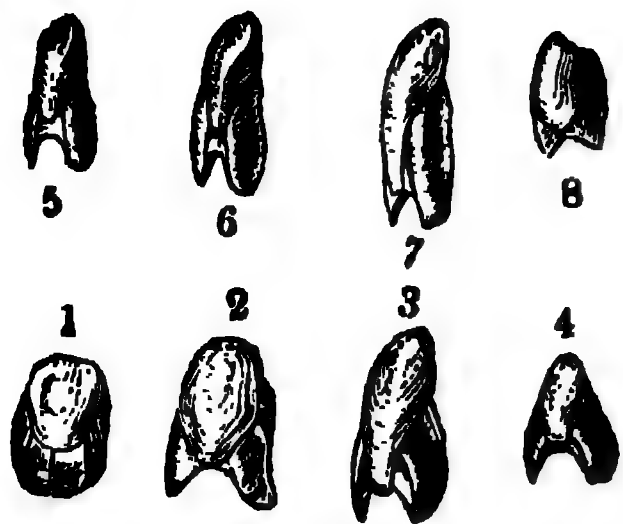


[Velutina capulöidea.]

CHITONS. CHITON TRIBE. CHITONIDÆ. A natural family of Gastropods, *Oscabrions* of the French, affording the only known instance of a protecting shell formed of many portions, or, as they have been somewhat incorrectly termed, valves, often in contact and overlapping each other, but never truly articulated. This anomalous structure is the probable cause of the various wanderings of those who have, each according to his own view, assigned the *Chitonidæ* their place, upon the faith of a too great value for this multiplication of shelly plates, composing a shield, or coat of scale armour for the soft parts. The following cut will give some idea of the structure of this shelly covering.



[Shelly plates or valves of Chiton.]



[Shelly plates, or valves of Chitonellus.]

These plates are bound together by a coriaceous border, which, as we shall presently see, is either plain, or beset with bristles, spines, &c.

The early naturalists took these shells for the peculiar armour of certain serpents, a conclusion to which they were doubtless helped by the love of the marvellous, so strongly shown in the accounts of the older travellers. By degrees the true condition of these mollusks became better known; and the opposite opinions of Linnæus and Adanson divided the naturalists of their age. The former arranged these shells among his multivalves, a class entirely artificial, and like all artificial classifications comprising the most heterogeneous forms. Adanson, on the contrary, took nature for his guide, and carefully observing the animal itself, while he regarded the shell as of comparatively small importance, placed *Patella* and *Chiton* side by side in his method. But the Linnæan school long reigned paramount; and Adanson's labours were comparatively forgotten, when Cuvier began to reform the crude state in which he found the *Mollusca*, and Lamarck and others aided in the work. Cuvier, who made anatomical investigation the basis of his opinions, at once pronounced in favour of Adanson. Lamarck afterwards adopted the same conclusion, but not till he had previously placed the Chitons at the end of the Acephalous Mollusks, between *Fistulana* and *Balanus*. Poli, in his magnificent work on the *Testacea utriusque Siciliæ*, in giving the anatomy of a Mediterranean species, became a valuable ally; for, although he still retained Linné's class of Multivalves, and although in his anatomical details he said nothing of the nervous system, a branch of animal organization essentially necessary to be known for assigning an animal its true place, he demonstrated enough clearly to show that *Chiton* bore no relation to the other Multivalves of Linnæus. M. de Blainville, however, resting upon the generative faculty of the *Chitons*, proposed, in opposition to these views of Cuvier and Lamarck, which had been adopted by almost all zoologists, to form a subtype of Mollusks under the name of *Malentozoaria*, in which each of the Linnæan genera, *Lepas* and *Chiton* constitute a class; the first, the *Lepadians* or *Lepadicea*, the second, the *Polyplaxiphores* or *Polyplaxiphora*. These almost singular views of De Blainville have not prevailed among zoologists; and Cuvier, in the last edition of the 'Règne Animal,' arranges the Chitons at the side of the *Patellæ*, forming from these two genera, his small family of *Cyclobranchians*.

Deshayes, in the article *Oscabrion*, in the 'Encyclopédie Méthodique,' enters at large into the organization of the Chitons, and discusses with much learning and acuteness the conflicting opinions of Cuvier and De Blainville.

The following is a summary of Deshayes's observations.*

Digestive organs. No projecting *head*, in which the Chitons resemble the *Phyllidians*. No *tentacula*, which are replaced by a kind of veil which surrounds the mouth. *Eyes*, as in many other Mollusks, the *Pteropoda*, for example, wanting. *Mouth* and *Œsophagus*, furnished with a very long tongue rolled spirally, and armed with horny teeth, a good figure of which is given by Poli. Stomach, intestine, and liver, like those of the other gastropods. Vent at the posterior extremity of the body, as in the Phyllidians, *Doris*, &c.†

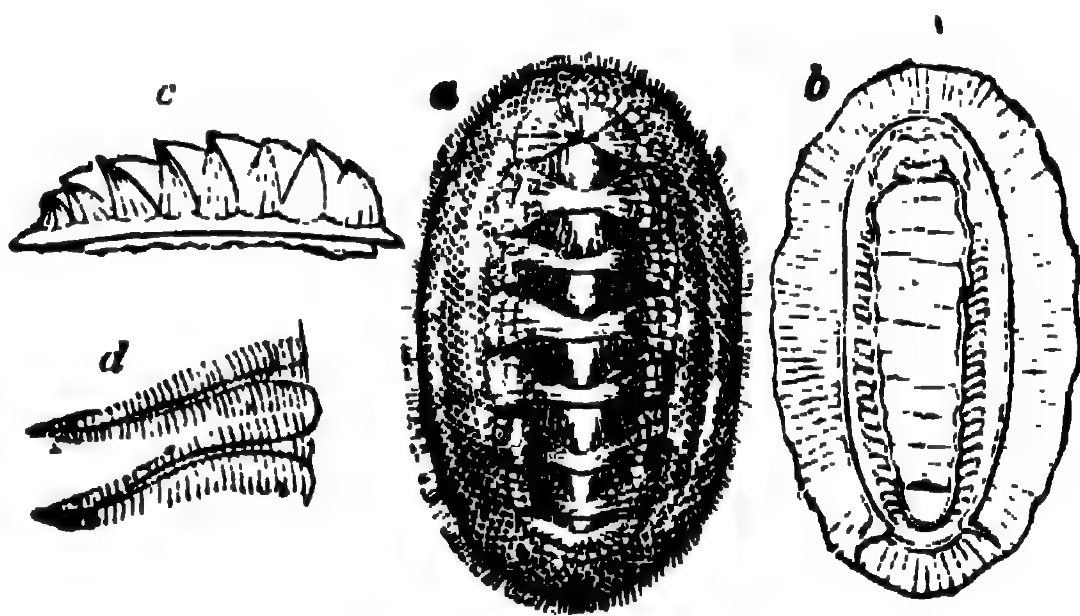
Respiratory and Circulating Organs. The *branchiæ* of the Chitons consist of a range of small triangular leaflets placed, as in *Patella* and *Phyllidia*, in the furrow which separates the foot from the mantle. The *heart* is situated posteriorly* in the mesial and dorsal line: it is symmetrical, and composed of a single ventricle and two auricles.

Organs of Generation. According to De Blainville, an ovary only, which, instead of having, as in the other mollusks, a single exit, has two external issues, one to the right, the other to the left. Deshayes observes upon this, that though he has made minute anatomical investigations, he has found it impossible to find the second issue of the organs of generation, but he acknowledges that the species which he dissected were small†.

Nervous System. Proved by Cuvier not to differ from that of other mollusks properly so called. It consists of what may be termed a complete œsophagian ring, and of various branches, which are given off divergingly towards the several organs.

Locomotive Organs. The oval foot, more or less wide, according to the species, extends the whole length of the animal.

Shell. Eight narrow, transverse, calcareous pieces, overlapping each other, and strongly implanted on each side in a thick and fibrous border of the mantle, which surrounds the whole body, and is sometimes, as we have observed, naked, but more generally covered with small scales, spines, or hairs. These pieces are not immoveable, as the animal can roll itself up or stretch itself out again for the purpose of progression or adhesion. To work this machinery, there are three muscles given off from the first piece to the second, three others given off from the second to the third, and so on throughout, so as to make the mechanism of this scale armour complete. One of these muscles occupies the mesial and dorsal line, the other two are lateral and oblique. The growth of the shell is analogous to that of the other mollusks.



[Animal of Chiton Squamosus.]

a, the animal and shell seen from above; *b*, the animal seen from below; *c* side view of the shell and animal in a creeping or adhering state; *d*, portion of branchiæ magnified.

The chitons then resemble the other mollusks: 1st., in the general form of the body; 2nd., in the organ of locomotion; 3rd., in the nature, form, and position of the branchiæ; 4th., in the heart, and in the distribution of the circulating vessels; 5th., in the mouth and its veil; 6th., in the tongue and the rest of the digestive organs: 7th., in the position of the vent; and 8th., last, but not least, in the nervous system.

What, then, are the differences? 1st, the form of the shell composed of eight pieces instead of one; 2nd, the mantle, which is more fleshy and fibrous than in the other mollusks; 3rd, the myology; 4th, the double issue of the organs of generation, allowing this difference to be established, whereas it is doubted. With regard to the absence of eyes, that defect exists in a considerable number of mollusks.

Hence Deshayes concludes, and the conclusion appears to us to be just, that the chitons are true mollusks, and that their place is not far distant from the *Patellæ*.

Geographical distribution. The species are numerous, and there are few rocky shores without some of them. As a general rule, the largest are found in warm climates, but there are exceptions; for instance, *Chiton setiger* and *Chiton Bowenii*, King, are found on the shores of Tierra del Fuego, and in the straits of Magalhaens: the former of these species grows to the length of two inches and three-

* Last edition of Lamarck, vol. vii., p. 487.

† The stomach is membranous, and the intestine is very long and much folded. The vent is situated under the posterior extremity

* Upon the rectum.

† Cuvier says that the ovary is situated above the other viscera, and that it would seem to open at the sides by two oviducts.

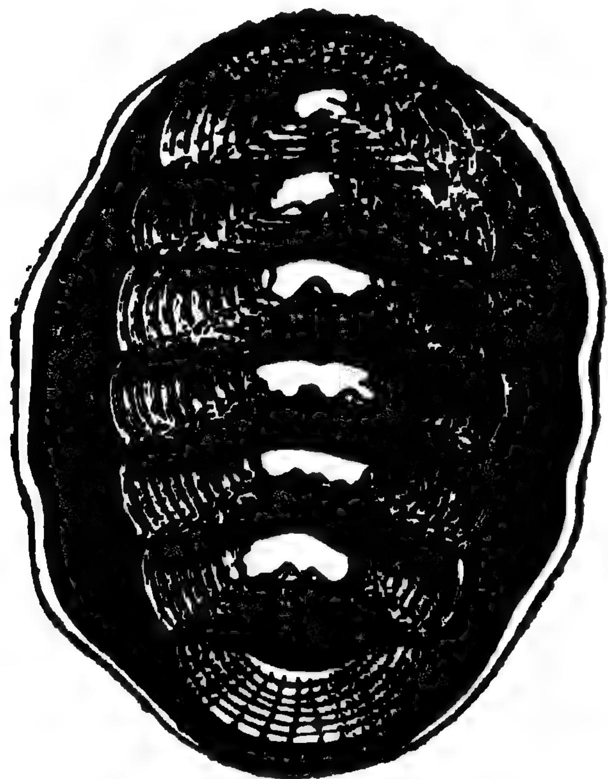
eighths, and the breadth of one inch and three-eighths, and the latter to the length of three inches and two-eighths, and the breadth of one inch and a half. No mention is made of them in the 'Supplement to Captain (now Sir Edward) Parry's Voyage' (1819—20), nor in the 'Supplement to Captain (now Sir John) Ross's Voyage' (1829—1833). The British species are small.

Locality. Rocky shores where it adheres, and also on stones and other submarine bodies. Found at depths varying from the surface to twenty-five fathoms.

Most zoologists are agreed that there are no differences sufficiently strongly marked to make a generic distinction between *Chiton* and *Chitonellus*; and, indeed, the gradations from the one to the other are so imperceptible, that there is no point where the line can be satisfactorily drawn. In the most completely-developed form of *Chiton* the shelly secretion greatly preponderates; in *Chitonellus* that secretion is comparatively small, and the great development is in the border of the mantle, which, in some instances, almost hides the comparatively-minute shelly pieces.

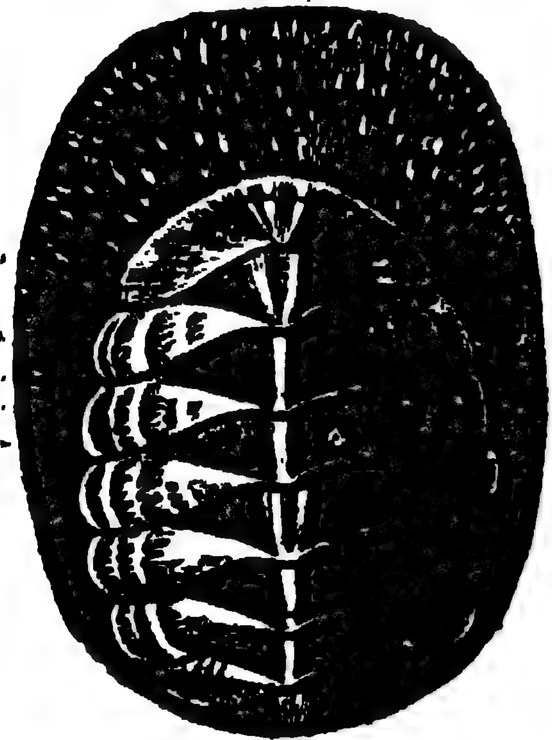
α. Species with the mantle border or marginal ligament, coriaceous and naked. Examples, *Chiton Chilensis*, Frembley, and *Chiton Blainvillii*, Broderip.

Chiton Chilensis. Shell oblong-ovate, opaque, thick, dark brown, smooth, dull; inside white, with pink markings on the first, second, and last valves. Valves with longitudinal *striæ*, crossed by irregular concentric ridges. Anterior and posterior valves semilunate, slightly punctated; second valve subcarinated, the front margin obtusely angled, lateral margins arcuate, and the posterior with a prominent beak, on each side of which diverges a rather elevated granulated ridge; the next five valves alike, bow-shaped, with a granulate ridge on each side. Border smooth, coriaceous, tough, thick, darker coloured than the shell, semipellucid, broad at the sides and narrow at the extremities. Locality, Valparaiso, in crevices of rocks and under stones. (Frembley.)



[Chiton Chilensis.]

Chiton Blainvillii. In this species the shape of the coriaceous border itself is not only very remarkable, but it is here and there fringed, though not with hair. M. Deshayes has placed this under his section of those species which have the border of the mantle fringed with hair or spines,

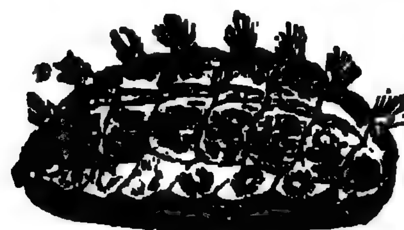


[Chiton Blainvillii. Copied by permission from Sowerby's 'Illustrations of Conchology.'—Recent Shells.]

probably from not having seen a good specimen. *Shell* roundish, anterior valve obscurely rayed, the posterior one very small and abrupt; the others concentrically lineated, the whole being rosy, variegated with white, brown, and greenish and, internally, white. The mantle-border orange-red, very narrow posteriorly, and enormously produced anteriorly, rounded and fringed here and there, especially on its anterior margin, with some short coriaceous processes. Locality, Inner Lobos Island, coast of Peru.

β. Mantle-border smooth, but with tufts of hair at the lateral extremities of each plate. Example, *Chiton Fascicularis*, Linnæus.

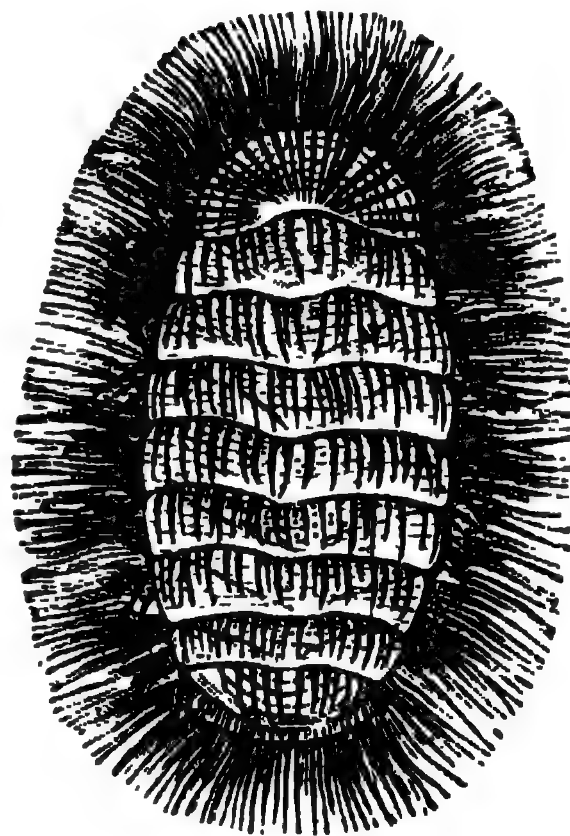
Shell apparently smooth, but when examined with a glass, proving to be rough like shagreen, except on the elevated dorsal ridge; margin surrounded with tufts of whitish hair, one at the junction of each valve, and two in the front, making eighteen in number. Colour brown or dark cinereous; length five-eighths of an inch; breadth rather more than two-eighths. Locality, British southern coasts. Montagu, who gives this description, says, that on the coast of Barbary it is not unfrequently an inch long.



[Chiton fascicularis.]

γ. Mantle-border hairy. Example, *Chiton Peruvianus*, Lamarck.

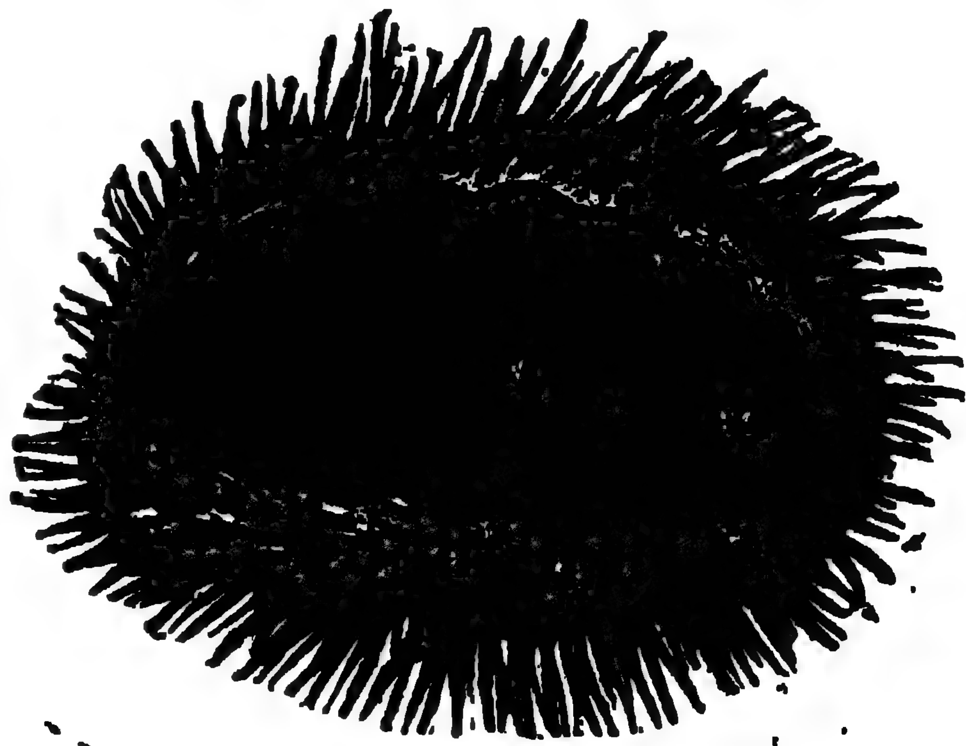
Shell oblong-ovate, opaque, dirty yellowish green, or yellowish brown, inside white. Valves thin, slightly elevated; posterior compartments of the dorsal valves a little raised and striated, with minute granulated striæ, and in like manner the other parts of the shell; under each valve is inserted a series of short black hairs, which lie on the back of the shell. Border narrow, coriaceous, thickly set with coarse black hairs. Length two inches, breadth one and a half. Found under stones at low water on the shores of Valparaiso Bay. There is a variety with the anterior valves much narrower than the posterior. (Frembley.)



[Chiton Peruvianus.]

δ. Mantle-border beset with spines. Example, *Chiton spinosus*, Bruguière; and *Chiton spiniferus*, Frembley.

Chiton spinosus. Shell brownish black, valves opaque,



[Chiton spinosus.]

moderate, with the sides granulated, the anterior valves entirely granulated. Mantle-border wide, and beset with long aculeated blackish spines, very much resembling those of certain *Echini*. Locality, South Seas, according to Péron. Length three inches.

N.B. Lamarck describes the valves as smooth, and the specimen figured by Sowerby in his Genera has them nearly so. This may be the consequence of age and corrosion, for in a comparatively young specimen the sculpture of the valves is that above described. The species is very rare at present.

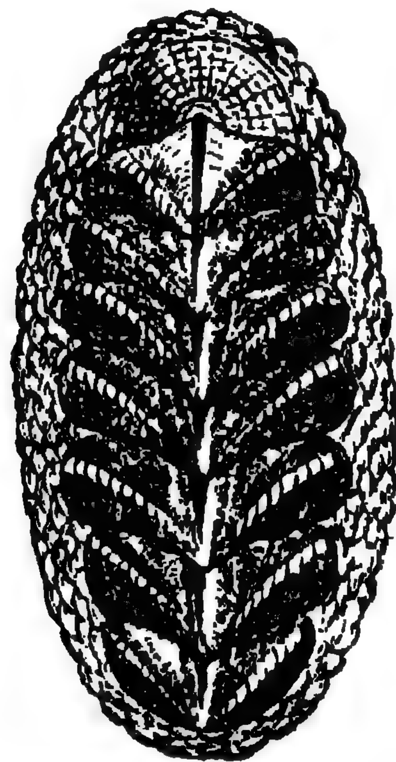
Chiton spiniferus. This is the *Chiton aculeatus* of Barnes, a name which had been preoccupied by Linnæus for another species, and the *Chiton tuberculiferus* of Sowerby in the 'Tankerville Catalogue;' but the latter name was given from an old specimen with broken spines, and has been rejected as inapplicable. Shell opaque, oblong ovate, reddish-brown, glossy; inside reddish-white. The posterior angles of the valves do not cover the anterior ones. Anterior valve with generally nine rows of raised dots diverging from the apex, but the number perhaps varies with the age of the shell. Second valve rather acutely beaked and carinated, longer than the five following, which are striated and shaped alike; these all rise into a rather acute beak, are carinated, each side of the carina being divided into two distinct portions, the anterior one the largest, and bearing broad, irregular, longitudinal striæ; a prominent row of raised dots, extending from the apex to the anterior angles of the valves, separates the compartments; the posterior portion glossy, with fine concentric striæ; the posterior margins with tooth-like granulations. Last valve striated, like the anterior compartments of the others, and rising into a rather prominent beak, leaning towards the posterior margin; from under the beak are raised dots, disposed in a similar manner to those on the anterior valve. Border coriaceous, thick, broad, rough, greenish or orange-coloured, and in the younger specimens thickly studded with blunt spines; but in the old shells the spines are short and scanty, and generally covered with corallines; the inner edge of the border, inserting itself under the posterior angles of the valves, has the appearance of being deeply separated. (Frembley.) This species grows to the length of five or six inches, but has then generally lost all its external beauty. We have seen many individuals in all the stages of growth, and have invariably found the spines of the aged ones covered with that calcareous matter which is so frequently found adhering to shells and submarine bodies, but we have never detected anything organic about that which was attached to the spines of this species. Locality, Chili and Valparaiso, where Mr. Frembley found several specimens in very exposed situations; so much so, that collecting them was attended with much difficulty, and not unfrequently with danger, from the violence of the sea breaking on the rocks to which they attach themselves very strongly. They are generally covered with sea-weed.



[Chiton spiniferus.]

ε. Mantle-border scaly. Example, *Chiton Coquimbensis*, Frembley.

Shell ovate, narrow, opaque, greenish-brown, shining; inside blackish: the anterior valves with numerous undulated, concentric ridges; the next rather acutely keeled; the five following alike: carina broad and smooth, on each side of which is a similar ridge diverging from the beaks, and forming with the carina a sagittate figure, and connected with it by several strongly marked ridges: from under the beaks, to the anterior angles of the valves, extend sharp, moniliform ridges, each side of which is coarsely striated longitudinally. Border thick, moderately broad, and covered with coarse, seed-like scales, which are attached laterally. Length three inches, breadth one and a half (Frembley). The description was taken from a young shell; for as the shell advances in age, the middle of the valves, which are very solid, becomes eroded and covered with adhesions, *Balani*, *Patellæ*, &c. Mr. Frembley says, that the only part of the coast where he found this species was the south side of Coquimbo Bay: their habits, he adds, are very similar to those of *Ch. spiniferus*, with the exception that they seem more gregarious.

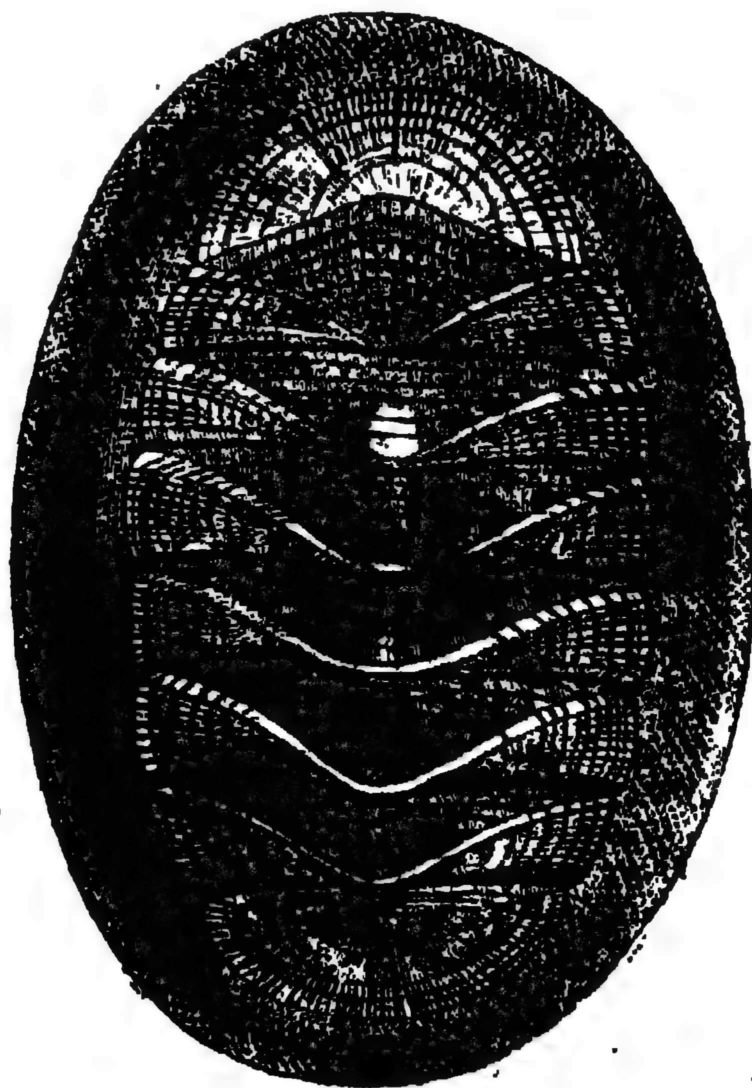


[Chiton Coquimbensis.]

ζ. Mantle-border granulous.

Example. *Chiton magnificus*, Deshayes.

Shell opaque, ovate, olivaceous, dull, dotted with lighter coloured spots: inside glaucous. The anterior valve with regular radiating striæ, crossed by concentric ridges; posterior margin nearly straight. Dorsal valves obtusely beaked, divided laterally into two compartments: the anterior having regular longitudinal striæ, crossed with others very minute and concentric; from under the beaks diverge to the lateral margins of the valves coarse and ir[illegible]gular striæ, which raise the posterior compartme[illegible] the other. The posterior valve has a well-defin[illegible] leaning towards the posterior margin. Border thi[illegible], moderately broad, and covered with fine shining bead-like gra-



[Chiton Magnificus.]

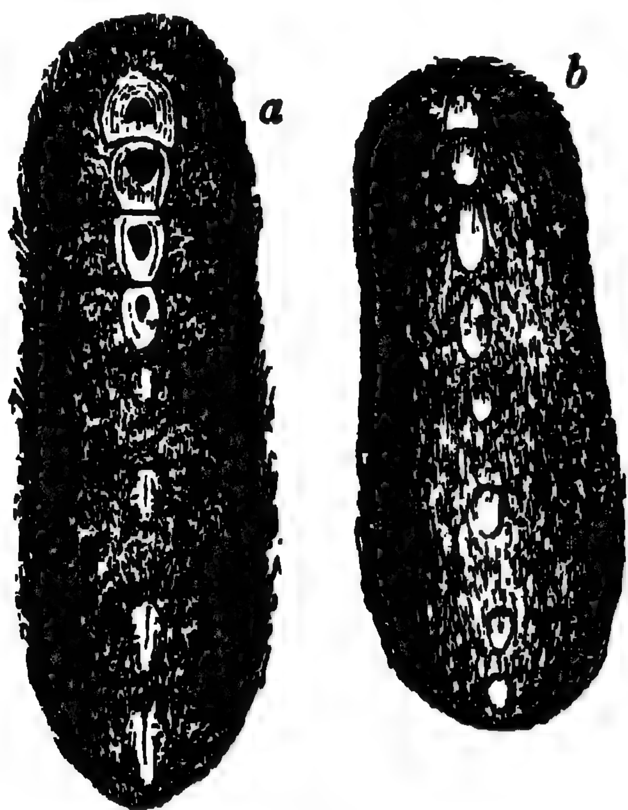
nulations, of the same colour as the shells, divided into two distinct portions, the upper of which is composed of finer beads than the lower, and which are placed transversely (Frembley). This is the *Chiton olivaceus* of Frembley, and *Chiton latus* of Sowerby (Tankerville Collection), which latter may be perhaps considered a variety, remarkable for its breadth. Deshayes had previously given to the species the name here assigned to it. The species grows to the length of four or five inches: we have seen one that reached four inches and a half when dead. There is another variety narrower than the ordinary individuals, and Mr. Frembley observes that, among the very young shells, some of them have their borders of a lighter colour than their shells, and spotted with black: this not being a constant character in all the young specimens, Mr. Frembley thinks they may be regarded as a variety. Locality, Chili.

* *

Species with the border highly developed, and the valves very small. (*Chitonellus.*)

These are more or less cylindrical, and vermiform, the valves being very small, and in some species almost entirely hidden under the skin of the border, giving the animal an almost naked appearance.

Examples. *Chitonellus lævis*, and *Chitonellus larvæformis**.



a, Chitonellus lævis; *b*, Chitonellus larvæformis.

FOSSIL CHITONS.

G. B. Sowerby states that the fossil species are rare; and that detached valves are sometimes found in the calcareous sand of the neighbourhood of Paris and in the English crag. Deshayes in his tables (Lyell) gives but one fossil species (tertiary): in the 7th vol. of his edition of Lamarck (1836), he says that up to that time (jusqu'à présent) but one fossil species was known; and that was discovered at Grignon by M. Defrance. Since, he adds, the genus has been found in the transition rocks (le terrain de transition) in the neighbourhood of Tournay; and he states that the knowledge of this curious and interesting fact is due to the researches of M. Duchastel and M. Puzos.

The student should refer to the great work of Poli (Testacea utriusque Siciliæ), the Memoir of Cuvier in the Annales du Muséum, the article *Oscabrion* (by De Blainville) in the Dictionnaire des Sciences Naturelles, and in his Malacologie; and that by Deshayes in the Encyclopédie Méthodique. He should also consult the writings of Broderip, Bruguière, Frembley, Gray, King, Lamarck, Linnæus, Montagu, Pennant, Quoy and Gaimard, Rang, Sowerby, and Wood.

CHITONELLUS. [CHITON.]

CHITTAGONG, a district in the south-east part of the province of Bengal, bounded on the north by Tiperah district, on the east by the Burmese empire, on the south by the province of Aracan, and on the west by the bay of Bengal. This district lies between 21° and 23° north lat., and between 91° and 93° east long.; its length from north to south is about 120 miles, and its greatest breadth 50 miles, but the eastern boundary has never been accurately defined, and the average breadth is supposed to be not greater than 25 miles. According to an estimate made in 1784, the district was computed to contain 2987 square miles, about two-thirds of which were unproductive hilly country. The level lands lie near to the sea; the interior is generally hilly, and covered with jungle, the rapid growth of which is favoured by the moistness of the climate. The rainy season sets in earlier than in most other parts of the province of Bengal, and continues later, sometimes till the middle of November. The country is watered by numerous streams, one-half of which flow towards the bay of Bengal, and the rest into the Irawaddy. The most considerable of these streams is the Kamaphuli, or Chittagong river, which, at its mouth, forms a secure harbour, but so embayed, that during the continuance of the south-west monsoon it is generally difficult for vessels to put to sea. The channel of this river at the capital, Islamabad, is about a mile broad; but a little higher up its width does not exceed 200 yards, although the tide continues to flow strongly up the river. The source of this river is in Ava, whence it flows south-west to the district of Chittagong, which it enters by the Mugh mountains, where many waterfalls occur.

The river Nauf, which forms the southern boundary of the district, is about 70 miles south of Islamabad; it is not navigable: the banks of this river are, for the most part, covered with thick jungle, and exhibit only a few spots cleared for cultivation, and a few miserable dwellings of huntsmen, who catch and tame elephants, which are sent from Chittagong to every part of Hindustan. In the valley of the Kamaphuli are some rich tracts of land, cultivated by Bengalese, which yield plantains, ginger, betel-leaf, sugar-cane, cotton, indigo, and tobacco. The land is parcelled out into very small divisions, having formerly been assigned for the support of the military stationed in the district, to prevent the incursions of the Mughs of Aracan. When this military establishment ceased to be necessary the farms became zamindaries, and have been so considered in the administration of the country. Between the hills are several well-watered plains and valleys, of small extent, which are cultivated partly by Hindus of Bengal, and partly by Mughs of Aracan, who migrated into the district upon the conquest of their country by the Burmese in 1783. The majority of the Mughs who thus settled in Chittagong are traders and mechanics, only a small proportion having become cultivators. Exclusive of the Mugh settlers, the inhabitants of Chittagong were estimated, in 1801, at 1,200,000; but this number is probably excessive, considering the physical circumstances of the country The Mohammedan inhabitants exceed the Hindus in number in the proportion of three to two.

It is supposed that Chittagong was once a frontier province, belonging to the independent kingdom of Tripura, and that during the conflicts between the Buddhists and Brahmins, it was governed sometimes by chiefs of one and sometimes of the other religion. During the wars between the Moguls and Afghans, the district was held by the Buddhists of Aracan, and yet at the beginning of the present century the population contained scarcely a single Buddhist. In 1582 this district was enumerated by Abul Fazl among the dominions of the Mogul sovereigns, yet it does not appear to have been actually in their possession until 1666. Nearly a century later (1760), Chittagong was ceded to the East India Company, by Jaffier Ali Khan. In 1826, when Aracan was taken from the Burmese, the political superintendence of Chittagong was included within the government of Aracan, and has so continued to the present time.

(*Ayin-i-Akbari*; Rennell's *Memoir*; Hamilton's *East India Gazetteer*; *Report of Committee of House of Commons* (1832) *on affairs of India.*)

CHITTOOR, a town and small pollam or district on the western side of the Carnatic, in 13° 15′ N. lat., and 79° 10′ E. long., eighty-two miles west from Madras. The situation is naturally strong, being between two ranges of hills, one of which bounds the Balaghaut, and the other forms an irregular sweep of various elevation, and approaches within a few miles of the sea at a short distance from Madras. This tract was acquired from the Nabob of the Carnatic in 1801, and an assessment of the lands was made in the following year; but it was not until 1804, that the British obtained complete and quiet possession through the expulsion of the Poligars, or small tributary chiefs by whom the lands were held, and who had never been thoroughly subdued by the Mohammedans. (Hamilton's *East India Gazetteer.*)

* Cuvier, in the last edition of the Règne Animal, has the following note to Chiton (Les Oscabrions). 'Les Oscabrelles (*Chitonellus*) de Lamarck et toutes les espèces de *Chiton* des auteurs doivent rester sous ce genre dont M. de Blainville a cru devoir faire une classe à part, qu'il nomme *Polyplaxiphores*, supposant qu'elle conduit aux animaux articulés.'

CHIVALRY has commonly been represented as a great institution, invented in the eleventh century, for a grand moral purpose—that of struggling against the deplorable condition of society at that period—of protecting the weak against the strong, and redressing individual injuries. So prevalent and so deeply-rooted has been this notion of the origin of Chivalry, that we find it set forth even in the new *Histoire des Français* of M. de Sismondi, a writer usually so clear-sighted and so little a slave to the routine of his predecessors. But a closely attentive as well as philosophical analysis of the history of European society, in the middle ages, proves this theory, or rather this supposition, to be deceitful. It shows us that Chivalry was not, in the eleventh century, an innovation, an institution brought about by a special exigency which it was expressly adapted to meet. It arose much more simply, more naturally, and more silently; it was but the development of material facts long before existing—the spontaneous result of the Germanic manners and the feudal relations. It took its birth in the interior of the feudal mansions, without any set purpose beyond that of declaring, first, the admission of the young man to the rank and occupation of the warrior; secondly, the tie which bound him to his feudal superior—his lord, who conferred upon him the arms of knighthood.

Of this we find an irrefragable proof in the history of the term *miles* itself, which was constantly used in the latinity of the middle ages to designate the chevalier, or knight. Towards the end of the Roman empire, the verb *militare* signified simply to serve, to discharge some service towards a superior, whether the service itself were of a military or a civil nature. The service originally denoted by this expression, indeed, was, no doubt, the military service exclusively; but the use of the term had in course of time been extended until it embraced every subordinate office and function. After the Germanic invasions of the declining Roman empire, we find it frequently employed in speaking of the household of the barbarian kings, and the offices which their companions held about their persons. Soon, by a natural retrogression, in conformity with the new turn given to the social state, the term *miles* resumed its almost exclusively warlike character, and denoted the companion, faithful to the service of his superior. It thus became synonymous with *vassus*, or *vassallus*, and indicated that a certain man held of another a beneficium, or fee, and was attached to him by that consideration; in short, from the ninth to the twelfth century, the word *miles* denoted, not the chevalier, or knight, as ordinarily conceived of, and as M. de Sismondi himself has described him, but simply the companion, the vassal, of a feudal superior.

Here we see the true and necessary origin of chivalry. But in the course of its development, when once the feudal society had acquired some degree of stability and self-confidence, the usages, the feelings, the circumstances of every kind, which attended the young man's admission among the vassal warriors, came under two influences which soon gave them a fresh direction, and impressed them with a novel character. Religion and imagination, poetry and the church, laid hold on chivalry, and used it as a powerful means of attaining the object they had in view, of meeting the moral wants which it was their business to provide for. So early as the ninth century we find some religious ceremonies associated with the Germanic practices on these occasions. A succinct account of the reception of a chevalier, as practised in the twelfth century, will show what progress this combination had made, and how powerfully the church had laid its grasp on every particular of that solemn act of the feudal life.

The young man, the squire, aspiring to knighthood, was first of all stripped of his garments and put into a bath, the symbol of purification. On his coming out of the bath, they clad him in a white tunic, the symbol of purity, a red robe, emblematic of the blood which he was to shed in the cause of the faith, and a black doublet, in token of the dissolution which awaited him as well as all mankind. Thus purified and clothed, the novice kept a rigorous fast for twenty-four hours. When evening came, he entered the church, and passed the night in prayer, sometimes alone, sometimes with a priest and with sponsors who prayed in company with him. The next morning, his first act was confession; after which the priest administered to him the communion; and after communion he heard a mass of the Holy Ghost, and commonly a sermon on the duties of a chevalier, and the new course of life on which he was about to enter. When the sermon was over, the novice advanced towards the altar, with the sword of knighthood suspended from his neck: the priest took it off, blessed it, and attached it to his neck again. The novice then went and knelt before the lord who was to knight him. 'To what end,' the lord then asked him, 'do you desire to enter into this order? If it is that you may be rich, repose yourself, and be honoured without doing honour to knighthood, then you are unworthy of it, and would be to the knighthood you should receive, what the simoniacal clergyman is to the prelacy.' And on the young man's answering that he promised well to discharge the duties of a knight, the lord granted his request.

Then did knights in attendance, and sometimes ladies, approach the novice, and array him in his novel garb, putting on first the spurs, next the hauberk or coat of mail, then the cuirass or breast-plate, then the brassarts or arm-pieces, and the gauntlets, and lastly girding on the sword. Then, he was *dubbed*, to use the modern English expression derived from the French *adoubé*, which, according to Ducange, signified *adopted*. The lord rose from his seat, went up to him and gave him the *accolade*, that is, three strokes with the flat of his sword upon the shoulder or the nape of the neck, and sometimes a blow with the palm of his hand upon the cheek, saying, 'In the name of God, Saint Michael, and Saint George, I make thee a knight;' and sometimes adding, 'Be thou brave, bold, and loyal.' The young man being thus knighted, they handed him his helmet, and brought him a horse upon which he sprang, usually without the aid of the stirrup, and caracoled within the church, brandishing his lance and flourishing his sword. Then quitting the church, he went and exhibited himself in like manner in public, beneath the castle walls, before the populace, whom he found eagerly awaiting their share of the spectacle.

It is easy to recognize in all this the influence of the priesthood, studious to associate religion with every circumstance of a solemnity so important in the warrior's life. Not only have the Christian sacraments their place in the ceremonial, but several of the observances more peculiarly chivalric are assimilated as much as possible to the administration of a sacrament. Such was the share taken by the ecclesiastical order in what may be called the exterior material part of the reception of a knight. And when we look into the moral character of chivalry, when we examine the series of oaths required of the knights at various periods from the eleventh to the fourteenth century, and mark the ideas and the feelings with which it was sought to imbue them, we find the clerical influence no less distinctly apparent. Certain it is, that in the obligations thus imposed upon the chevalier, we find a moral development extremely foreign to the state of lay society at that period. Moral notions so exalted—often so delicately scrupulous—above all, so humane, and so constantly impressed with the religious character, evidently emanated from the clergy. They alone then viewed the duties and relations of men in such a light; and their influence, it must be owned, was constantly employed in directing towards the fulfilment of those duties, and the improvement of those relations, the ideas and the usages to which chivalry had given birth. Whatever evils resulted from the unscrupulous and improvident use which the Roman church made of this direct influence over the power of the sword, in promoting so many crusades against the infidel and the schismatic, it undeniably made use of the chivalric institutions which feudalism had brought forth, in labouring to introduce internal peace in society, and a stricter and more comprehensive morality into individual conduct.

In proportion as this endeavour succeeded, and as chivalry more and more appeared under a character at once warlike, religious, and moral, at once conformable and superior to the actual manners, it seized upon and inflamed the imaginations of men; and in like manner as it had intimately bound itself up with their belief, so it also became the ideal standard of their aspirations, and the source of their most exalted pleasures. Poetry, in short, laid hold on chivalry, as religion had already done. As early as the eleventh century, the chivalric ceremonies, duties, and adventures, formed the mine to which the poets resorted for the means of charming the people; of at once gratifying and stimulating that craving of the imagination, that thirst for incidents more varied and more stirring, for emotions purer and more elevated, than real life affords. For it

should be observed that in the earlier stages of society poetry is not merely a national pastime; it is also a means of progress, exalting and developing man's moral nature. The poetical remains that have descended to us from that age show, that the poet imposed upon the chevalier the fulfilment of the same duties, and the practice of the same virtues, as were inculcated in the more solemn exhortations of the priest.

It is an oft-repeated observation, that all this was mere poetry, a fine chimæra, bearing no resemblance whatever to the reality. And indeed, when we consider the state of manners in those three centuries, and the incidents of daily occurrence that filled the lives of men, the contrast between the duties and the actions of the chevaliers is truly shocking. The period before us is undoubtedly one of the most grossly brutal in the history of European society, one in which we find the greatest amount of crime and violence, in which the public peace was most incessantly disturbed, in which the most dissolute manners prevailed. To any one attending only to the positive and practical state of society, all this poetry and morality of chivalry looks like sheer falsehood. Yet it is undeniable that the chivalric morality and poetry existed simultaneously with these disorders, with this barbarism, with all this deplorable social state. The monuments are before us: the contrast, we repeat, is shocking, but it is real.

This very contrast, however, forms the great distinctive characteristic of the middle ages. When we look into other social systems, as the Greek and Roman, when we examine, for instance, the early stage of Greek society, its heroic age, of which the poems that bear the name of Homer present a faithful mirror, we there find nothing resembling the contradiction that strikes us in the middle ages. The practice and the theory of manners are there nearly accordant. We do not find men having ideas much purer, nobler, and more generous than their daily acts. Homer's heroes seem quite unconscious of their own brutality, ferocity, selfishness, and covetousness; their moral science is no better than their conduct; their principles are on a level with their acts. We find it to have been the same with all other social systems in their vigorous and turbulent youth. But in Europe, on the contrary, in the middle ages, while the deeds are habitually detestable, while crimes and disorders of every description abound, yet we find dwelling in the minds and imaginations of men nobler instincts and more exalted aspirations. Their notions of virtue are much more developed; their ideas of justice incomparably better than what is practised around them, than what they practise themselves. A brighter ideal of morality hovers, as it were, above that rude and stormy social state, attracting the view and commanding the respect of men whose lives are little conformable to it. Christianity must undoubtedly be ranked among the principal causes of this fact: for its great characteristic is, its labouring to inspire men with a high moral ambition, to keep constantly before their eyes a standard infinitely superior to human reality, and stimulate them to attain it. But whatever be the cause, the fact is indubitable. We find it everywhere in the middle ages, in the popular poetry as well as in the exhortations of the priests. The moral conceptions of men rose far above the practice of their lives. Nor let it be thought, because those conceptions did not govern their actions, because their practice so strangely belied their theory, that the influence of the theory was absolutely null. The habitual judgment of men upon human actions is not without its effect. It has been justly remarked, that a bad action is better than a bad principle: a bad action may remain isolated and solitary; but a bad principle is constantly fructifying: for, after all, it is the mind that governs; and a man acts from reflection much oftener than he is himself aware of. In the ages of chivalry, we repeat, the principles were infinitely better than the acts. For instance, at no period perhaps has the intercourse between the sexes been more licentious; yet never was purity of manners more strongly enjoined or more feelingly described. Nor was it a theme for poetic eulogy alone. We find from a multitude of testimonies that the public thought in this particular as the poet spoke, that the prevailing moral notions were pure and noble amidst all the rudeness and licentiousness of conduct.

This, then, was the grand moral characteristic of chivalry, which entitles it to an important place in the history of modern civilization. If, on the other hand, we regard it not in a moral but in a social point of view, not as an idea, but as an institution, it merits but slight consideration; for though it had a great and stirring part in the world's affairs, yet, as already shown, it did not constitute an actual specific institution at all. The feudal lords, the possessors of fiefs, were alone chevaliers; they alone, with few exceptions, had the right to become so. The knights formed no separate class of society with distinct functions and duties. Thus chivalry, properly so called, being inseparably bound up with feudality, could not survive its extinction; and accordingly, so early as the fourteenth century, when compared with its condition in the twelfth, we find it to be rapidly declining.

It had, however, given birth to the religious orders, as the Templars, the knights of St. John, and the Teutonic knights; and it was beginning to produce the courtly orders—those of garters and ribbons—the knighthood of mere rank and parade. It was destined to tincture yet a long while the manners, the language, and the literature of European society. But the true chivalry, that to which alone the name can strictly be applied, flourished and fell with feudalism.

CHIVES, a small species of allium called ampeloprasum. Its bulbs have the usual garlic odour of the genus, and are used in soups and stews: they are but little cultivated.

CHLÆ'NIUS, a genus of coleopterous insects, of the family *Harpalidæ*, and section *Patellimmanes* (Dejean.)

The species of this genus are all of tolerably large size, very elegant in form, and generally adorned with various hues of green, the colours being rich, but not glossy, owing to the upper parts being more or less covered with a very delicate pubescence, which produces a silk-like appearance. Very many of the species have the legs and antennæ of a pale yellow colour, and the outer margin of the wing-cases of the same tint, and some have the elytra adorned with large yellow spots.

The genus Chlænius constitutes a very large group of the Harpalidæ, which, according to our views, embraces the genera *Epomis* and *Dinodes*, we will therefore briefly notice the distinguishing characters of these three groups.

All three of the genera agree in having the tarsi of the anterior pair of legs dilated in the males, and a bifid tooth in the middle of the emargination of the mentum; but they differ chiefly in the form of the terminal joint of the palpi, and the difference may be thus expressed:—

Terminal joint of the palpi.

Elongated and truncated at the apex, *Chlænius*.
Elongated and distinctly securiform *, *Epomis*.
Short and slightly securiform, *Dinodes*.

As regards the form of these insects, the body is generally more or less oval, and very slightly convex: the thorax is almost always considerably narrower than the elytra, broad towards the anterior part, and diminishing in width towards the posterior. The head is rather long, the eyes project considerably, and are rather remote from the base of the head, the portion of the head before the eyes is rather pointed.

The species are found under stones, weeds, and almost any rubbish which will afford them shelter; sometimes under the loose bark of old trees, near the root, but they must be sought after in the vicinity of water.

Of the genus Chlænius M. Le Comte Dejean enumerates one hundred and fifteen species, a great portion of which are European; many are from Africa, the East Indies, and North America, but South America and Australia appear to be almost destitute of these insects.

In England eight species have been discovered; of these however two only have been found in any abundance. *Chlænius vestitus* (*Carabus marginatus*, Lin.) is very common in the south of England, and is found under stones by the edges of ponds where gravel abounds. It is nearly half an inch in length, black beneath, and of a rich green colour above: the elytra are distinctly striated, very finely punctured, and covered with a delicate pubescence of a golden hue: their outer margin is of a pale yellow colour: this tint is confined to a narrow line towards the base of the elytra, but forms a broad patch at the apex; the head and thorax are rather glossy; the latter is finely punctured throughout, and has the margin slightly tinted with yellow; the legs, antennæ, and palpi are yellowish-white when the insect is alive.

* Securiform (*securiformis*). 'When the last joint of the feeler is triangular, and the preceding joint is connected with the vertex of the triangle.' Kirby and Spence's *Introduction to Entomology*, vol. iv., p. 320

Of the genus *Epomis* M. Dejean enumerates six species, one of which is said to have been found in England, but it is here decidedly very rare, since only three specimens are recorded. It is about three-quarters of an inch in length; the head and thorax are of an obscure brassy-green colour and slightly punctured; the elytra are black, with the outer margin pale yellow; the legs and antennæ are also yellow.

This species is not uncommon in France and Italy.

The genus *Dinodes* only embraces four species. *D. rufipes* is about half an inch in length, of a rich blue colour above, and finely punctured throughout: the legs and base of the antennæ are of a reddish-yellow colour.

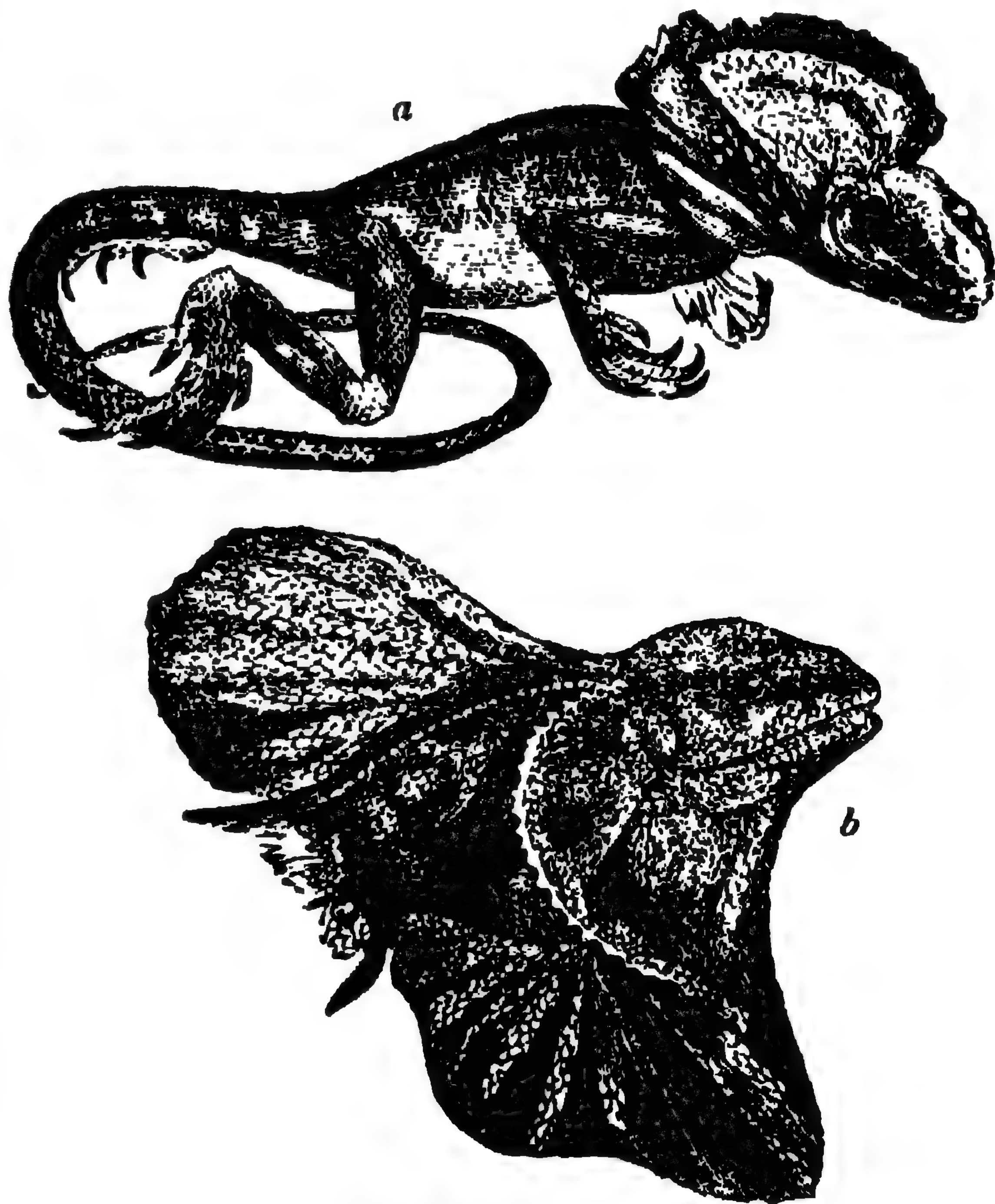
The thorax in this genus (taking *D. rufipes* as the type) is broader and more rounded than in the genera Chlænius and Epomis. The species described is found in France and Italy.

CHLAMYDOSAURUS, a genus of Saurians, founded by Mr. Gray, upon a specimen brought home by Captain Phillip Parker King, R.N., F.R.S., &c., on his return from his survey of the intertropical and western coasts of Australia, performed between the years 1818 and 1822. The following is Mr. Gray's description:—

Animal scaly; the head depressed; the nostrils placed on the side, midway between the eyes and the end of the head; the drum of the ear naked; the front teeth conical, awl-shaped (eight in the upper, and four in the lower jaw), the hinder ones longest; the side or cheek teeth compressed, short, forming a single ridge, gradually longer behind; tongue short, fleshy, with an oval smooth disk at each side of the lower part of its front part; neck rather long, furnished on each side with a large plaited frill, supported above by a crescent-shaped cartilage, arising from the upper hinder part of the ear, and, in the middle, by an elongation of the side fork of the bone of the tongue; body compressed, legs rather long, especially the hinder ones; destitute of femoral pores; feet four, with five toes, the first having two, the second three, the third four, the fourth five, and the little finger and toe three joints; claws compressed, hooked; tail long, nearly round, scaly. Example, *Chlamydosaurus Kingii*. The colour is yellowish-brown, variegated with black. The head is depressed, with the sides erect, leaving a blunt ridge on the upper part wherein the eyes are placed. The ridge over the eyes is covered with larger scales than those over the head. The eyes are rather small, with a fleshy ridge above them, and the eyelids are covered with minute scales, and surrounded by a delicate serrated ridge of small upright ones. The lips are surrounded by a row of oblong four-sided scales, arranged lengthways, the front scale of the upper lip being the largest. The chin is covered with narrow mid-ribbed scales, with a five-sided one in the centre, and several of larger size just over the front of the fork of the lower jaw. The nostrils are surrounded by a rather large orbicular scale, situated nearly mid-way between the eye and the end of the upper jaw, the tubes pointing forwards. The side of the face has a very obscure ridge extending from the angle of the mouth to the under part of the ear. The neck is covered with small scales. The frill arises from the hinder part of the head, just over the front of the ears, is attached to the sides of the neck, and extends down to the front part of the chest, supported above by a lunate cartilage arising from the hinder dorsal part of the ear, and in the centre by a bone which extends about half its length. Each frill has four plaits which converge on the under part of the chin, and fold it up on the side, and a fifth where the two are united in the centre of the lower part of the neck. The front part of its upper edge is elegantly serrated, but the hinder or lower part is quite entire: the outer surface is covered with carinated scales, those in the centre being the largest. The inner surface is quite smooth. The scales of the back are oval, and nearly smooth; those of the lower part of the body and upper part of the legs have a short mid-rib, and those of the sides and joints of the limbs are minute. The tail is twice as long as the body, roundish, covered with scales which have each a sharp mid-rib, and towards the termination, which is blunt, form six rows, so as to render that organ obscurely hexagonal. The toes are long, very unequal, compressed, and scaly. The claws are hooked, and horn-coloured.

Dimensions. Length of the tail, twelve inches; of the body, five; of the head, five and a-half. Breadth of the head over the eyes, one inch. Length of the thigh, one inch nine-tenths; of the foot and sole, two inches two-tenths; of the outer edge of the frill, ten inches.

Locality and *Habits*. We owe the discovery of this extraordinary Saurian to Mr. Allan Cunningham, who accompanied Capt. King's expedition as his Majesty's botanical collector for Kew Gardens, and to whom naturalists in general are so much indebted for the zeal displayed by him in favour of natural history, and for the liberality with which he has communicated the results of his labours. He found the specimen from which the description was taken on the branch of a tree in Careening Bay, at the bottom of Port Nelson, and sent it to Sir Everard Home, by whom it was deposited in the Museum of the Royal College of Surgeons. The following is the account of the capture in Mr. Cunningham's Journal:—'I secured a lizard of extraordinary appearance, which had perched itself upon the stem of a small decayed tree; it had a curious crenated membrane, like a ruff or tippet round its neck, covering its shoulders, and when expanded, which it was enabled to do by means of transverse slender cartilages, it spreads five inches in the form of an open umbrella. I regret that my eagerness to secure so interesting an animal did not admit of sufficient time to allow the lizard by its alarm or irritability to show how far it depended upon, or what use it made of, this extraordinary membrane when its life was threatened. Its head was rather large, and eyes, whilst living, rather prominent; its tongue, although bifid, was short and thick, and appeared to be tubular.' According to Captain King, the colour of the tongue and inside of the mouth was yellow. Mr. Gray is of opinion that this genus is nearly allied to the *Agamæ*. [AGAMA, Zoology.] We give a representation of the dead animal from the figure in the Appendix to Captain King's 'Voyage,' where the animal and its capture are described; and, below it, a representation of the living head, as it is seen in the illustrations to the 'Suites à Buffon.'



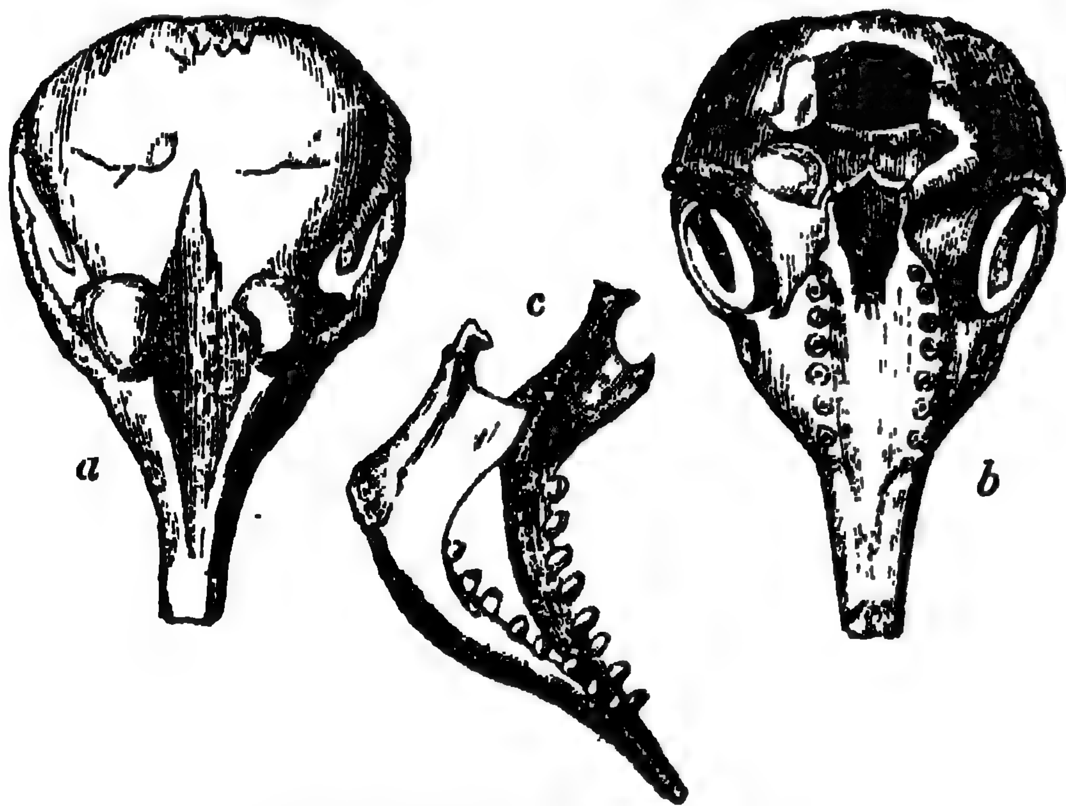
[Chlamydosaurus Kingii.]

a, the animal in the Museum of the College of Surgeons; *b*, representation of the living head.

CHLAMY'PHORUS (Zoology), Dr. Harlan's name for a genus of quadrupeds, of the order *Edentata*, first described by him in the 'Annals of the New York Lyceum of Natural History,' vol. i., from a specimen presented to the Philadelphia Museum, on the 18th December, 1824, by Mr. William Closeberry, according to whom it is the *Pichiciago* of the Indians in Mendoza (its native place), on the east of the Cordilleras, in lat. 33° 25′, and long. 69° 47′. It had been obtained on the spot in a living state, but lived in confinement only a few days. The viscera and the greater portion of the skeleton had been removed before the animal came into Dr. Harlan's possession. In March,

1828, the council of the Zoological Society of London, influenced by the recommendation of Mr. Vigors, placed in the hands of Mr. Yarrell a specimen of this rare and new animal, and the latter able zoologist so executed the trust reposed in him, as to produce a perfect skeleton, without injuring the skin, which was mounted by Mr. Leadbeater. When Mr. Yarrell returned the specimen to the Society, he accompanied it with a valuable paper on the osteology of the animal, from which we are enabled to supply the information which the absence of materials prevented Dr. Harlan from giving.

Osteology. The form of the head presents the figure of an irregular cone, the base of which is turned toward the spine; the cranium does not exhibit any sutures; the cavity capacious; the frontal bone supporting two rounded processes projecting upwards and somewhat outwards; the space between them occupied by a substance resembling in appearance adipose matter, from which issued a fluid-like oil. From the anterior part of the base of these two rounded processes, a narrow ridge of bone extends forwards on each side converging towards the nose. The nasal bones elongated, the orifice opening downwards. No incisor nor canine teeth in either jaw; molars $\frac{8}{8}$, cylindrical, separate, encircled with enamel, but none on the crowns; the first tooth on each side in the lower jaw, having no opponent, is the longest, the remaining seven opposed to the first seven of the upper jaw, and taking angular impressions on their surfaces by contact; the direction and depth of the alveolar cavities of the upper jaw distinctly marked on the outside by parallel ridges; in the lower jaw the alveolar cavities are pierced the whole depth. The anterior portion of the lower jaw is elongated; the inferior edge concave the first half of its length, then convex; the plate broad, rising at right angles with the line of the teeth; the condyloid process longer than the coronoid, the condyle itself elongated transversely. The external meatus auditorius is extended in the form of a semicircular cylindrical tube of bone, curving round the base of the zygoma, and passing forwards terminates in an aperture immediately behind the eye. The orbits and temporal fossæ united; the zygomatic arch is slender posteriorly, but becomes much stronger towards the front, expanding downwards, and furnished with an acute descending process. The occipital foramen is of great size.



[Skull of Chlamyphorus truncatus.]

a, skull seen from above; b, the same seen from below; c, lower jaw

The cervical vertebræ seven, the first large, the articulating surface broad; the 2nd, 3rd, and 4th, very firmly ossified together, pierced with foramina for the passage of the cervical vessels; the 5th united to the 4th on the under surface only; the 6th and 7th slender and separate, allowing the head great freedom of motion upwards; the whole of the last six grooved on the under surface, in the line of the passage of the œsophagus. Dorsal vertebræ eleven, the spinous process of the first slender, three-eighths of an inch long, the others diminish gradually in length, but increase in size; all directed backwards. The first rib is very broad, and from the 2nd to the 8th, the ribs of the *Chlamyphorus*, like those of birds, are firmly united to the sternum without the intervention of an elongated cartilage; and, again like those of birds, are also supplied with a false joint, at the distance of about two-thirds of their length from the spine to the sternum. The 9th, 10th, and 11th, being false ribs, are united in the usual way to each other, and to the 8th, by elongations of cartilage from their extremities. The portions of ribs intervening between the false joints and the sternum are in the 6th, 7th, and 8th ribs, consolidated, broad, flattened portions of bone, which form the boundary of the anterior and lateral parietes of the thorax. The first bone of the sternum is broad and flat, the superior surface regularly concave, the inferior irregularly convex. Upon the anterior edge of the sternum are two prominences, to which are attached the extremities of each clavicle. From each of these articulations a slightly elevated ridge proceeds backwards along the inferior surface of the sternum, converging towards the centre, where they become united, and form a prominent crest. The lateral edges of this first bone of the sternum are articulated at its anterior extremity to the first and broadest rib; from this part the bone suddenly becomes narrowed posteriorly, and terminates in a concave articular surface to which the second bone of the sternum is attached. Judging from the imperfect remains of the second bone, of which the upper part only was distinguishable, it would appear that its form was oblong, the superior surface concave. The remaining portion of the sternum was too much mutilated to admit further description.



[Cervical vertebræ, first bone of the sternum, with parts of the first and second ribs, seen from below.]

Lumbar vertebræ three, the spinous processes short and flattened; the two last dorsal vertebræ, as well as the lumbar, furnished with long oblique processes directed forwards, upwards, and outwards; the transverse processes of the first two lumbar vertebræ considerably elongated, the last possessing a rudiment only.

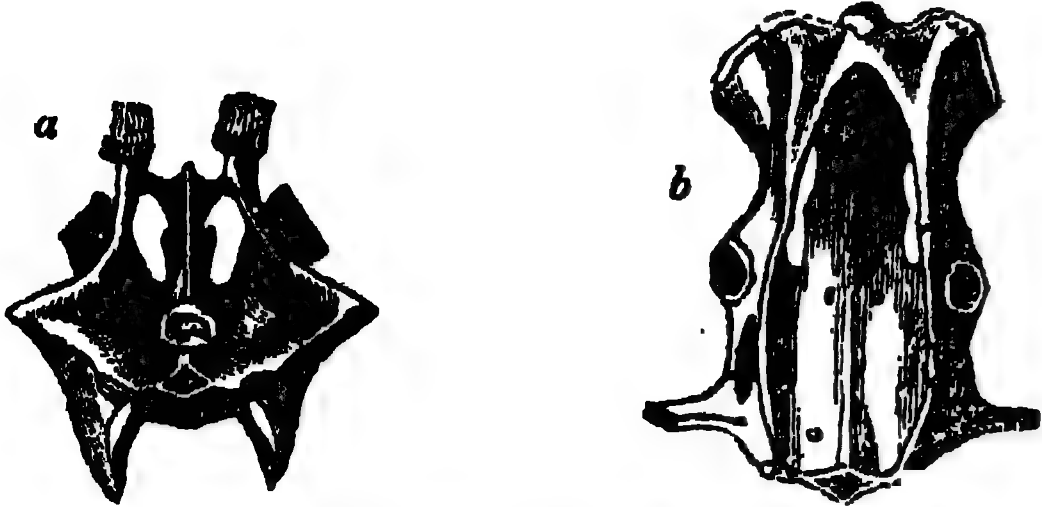
The whole of the sacrum and innominata is so peculiar and unique in character, that it is scarcely possible to give any correct idea of this part, without the assistance of accurate representations. The superior part of the ilium is flattened, the upper part bent to form an arched plane of bone, the concavity of which faces downwards and outwards; the crista of great length from before backwards. The inferior portion of the ilium is much stronger, inclining outwards, from its junction with the sacrum to the acetabulum.

The transverse and spinous processes of the sacrum are represented by three slender plates of bone, which, approximating as they pass backwards, are united to form a septum, extending down the median line of the sacrum to the tail. A channel is formed on each side of this septum by a thin flat plate of bone, which, arising from the posterior and superior part of the ischium on each side, is bent over the back part of the sacrum, and fixed to an arched and prominent plate of bone, which is extended from this septum outwards, to form a junction with it. The channels thus produced are bounded below by the sacrum, on the inner sides by the septum, on the outer sides by the ascending plates of bone just described, and above by the junction of both. From this union a short osseous stem issues horizontally on each side, and expands into a flattened circular plate of bone, to the rough surface of which, as well as to the tuberosity of the ischium below, portions of the truncated exterior of the animal are firmly attached.

The under surface of the sacrum is broad and flattened, and marked by an indistinct central ridge. The pelvis is open in front, the ossa pubis on each side do not incline inwards, but descend at right angles from the horizontal surface of the sacrum. In the circumstance of the pelvis being open, there is a second resemblance to the bony structure in birds.

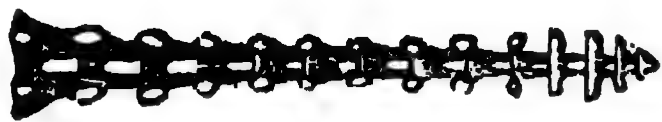
The caudal vertebræ are fourteen in number; the transverse processes of the last four are elongated, to support the thin dilated lateral edges of the paddle or spatular extremity of the tail. Large muscles are imbedded in the two cavities formed on the upper surface of the sacrum by its septum and the two lateral elevated portions of the

ischium before described; and there are antagonist muscles



a, the pelvis seen from behind; b, the same seen from below.

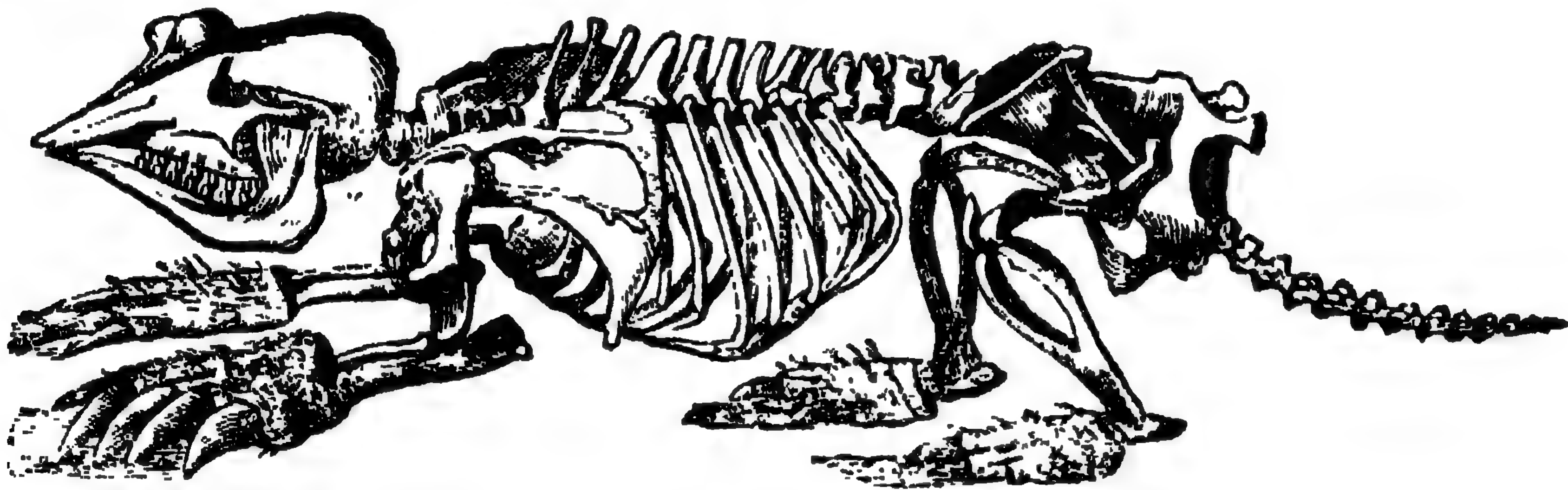
of equal size on the under surface. The tendons of these muscles were inserted on the upper and under parts of the caudal vertebræ, giving great power to the tail, which is probably exercised in removing backwards the loose earth accumulated under the belly of this burrowing animal by the action of the fore legs, and for which purpose the expanded and flattened extremity seems well calculated.



[Vertebræ of the tail.]

The scapula has its superior margin straight, ending in a notch of great size; the base rounded; the inferior margin concave, and the posterior inferior angle considerably elongated; the coracoid process but little produced, the spine elevated, the acromion very long, passing forwards, downwards, and inwards, over the head of the humerus, to be articulated to a long and slender, but perfect clavicle. There is a second spine of smaller size, parallel to, but beneath the true spine. The humerus is three-fourths of an inch in length, large, and broad; the deltoid crest prominent; between which and the external condyle a deep groove is formed for the lodgment of muscles, &c.; both condyles very much elongated transversely; the inner condyle perforated above; the edge rising from the external condyle acute. The radius small, and seven-sixteenths of an inch in length; the ulna flattened, concave upwards, the olecranon nearly as long as the ulna, horizontally flattened also, and presenting a superior concave surface, ending in a curve pointing downwards. The feet furnished with sesamoid bones for the insertion of the tendons of the flexor muscles.

The femur, thirteen-sixteenths of an inch long, large and strong; the length of the neck considerable; the great trochanter elongated backwards beyond the line of the articulation of the head of the femur with the acetabulum, and ending in a tuberosity; the lesser trochanter directed downwards; a third trochanter projecting from the outer side of the shaft of the femur somewhat above the middle; the condyles moderately elongated transversely, the outer having a crest directed backwards. The tibia and fibula fifteen-sixteenths of an inch, flattened, concave inwards, firmly anchylosed at each extremity, and arched in opposite directions, giving an appearance of great size and strength to the leg. The os calcis elongated backwards, flat, and ending in a curve slightly inclined upwards. Hind feet plantigrade.



[Skeleton of Chlamyphorus truncatus, with the exception of the feet, which are covered with the integuments.]

Mr. Yarrell observed the following points of resemblance between the skeleton of *Chlamyphorus* and that of other quadrupeds:—1. Beaver (*Castor Fiber*), in the form and substance of some of the bones of the limbs, in the flattened and dilated extremity of the tail, and the elongation of the transverse processes of the lower caudal vertebræ, but no further. 2. Mole (*Talpa Europæa*), in the shortness and great strength of the legs, and in the articulation of the claws to the first phalanges of the toes; but in the form of the bones of the anterior extremity, as well as in the compressed claws, it is perfectly different, nor do the articulations of the bones, nor the arrangement of the muscles, allow any of the lateral motion so conspicuous in the mole. The hinder extremities of *Chlamyphorus* are also much more powerful. 3. Sloth (*Bradypus tridactylus*), in the form of the teeth, and in the acute descending process of the zygoma, but not otherwise. 4. Armadilloes (*Dasypi*), in the coat of mail, in the peculiar ossification of the cervical vertebræ, in possessing the sesamoid bones of the feet, and in the general form of the bones, except those of the pelvis; they differ however in the form and appendages of the head and in the tail. 5. *Orycteropus Capensis* and *Myrmecophaga jubata*, in some of the bones. 6. *Echidna* and *Ornithorhynchus*, in the form of the first bone of the sternum, and in the bony articulations as well as the dilated connecting plates of the true and false ribs. 7 and 8. *Ruminantia* and *Pachydermata*, in the form of the lower jaw, and in other points equally obvious. The unique points in its structure appear to be the form of the head and the open pelvis.

Dr. Buckland (Bridgewater Treatise) considers *Chlamyphorus* one of the nearest approximations to *Megatherium*, particularly in regard to its coat of mail, and in the adaptation of the animal for digging.

According to Dr. Harlan, the total length of the entire animal is five inches two-eighths. The *shell* which covers the body is of a consistence somewhat more dense and inflexible than sole leather of equal thickness, and is composed of a series of plates of a square, rhomboidal, or cubical form, each row separated by an epidermal or membranous production, which is reflected above and beneath, over the plates: the rows include from fifteen to twenty-two plates, the shell being broadest at its posterior half, extending about one-half round the body. This covering is loose throughout, excepting along the spine of the back and top of the head, being attached to the back immediately above the spine by a loose cuticular production, and by the two remarkable bony processes on the top of the *os frontis*, by means of two large plates, which are nearly incorporated with the bone beneath; but for this attachment the covering would be very easily detached. The number of rows of plates on the back, counting from the vertex, where they commence, is twenty-four: at the twenty-fourth the shell curves suddenly downwards, so as to form a right angle with the body: this truncated surface is composed of plates, nearly similar to those of the back: they are disposed in semicircular rows, five in number the lower margin, somewhat elliptical, presents a notch in its centre, in which is attached the free portion of tail, which makes an abrupt curvature, and runs beneath the belly parallel to the axis of the body, the extremity of the tail being depressed, so as to form a paddle: the rest of the tail compressed. The superior semicircular margin of the truncated surface, together with the lateral margins of the shell, are beautifully fringed with silky hair.

Head.—Posterior half, broad, anterior half, before the eyes, tapering; the occiput is covered by the five first rows of the back plates with which they are continuous; the occiput not distinguishable externally. The anterior half of the top of the head is covered, first, by a row of large plates, five in number, which are firmly attached to the bone beneath, particularly the two outer; secondly, by a smaller row, six in number, anterior to which, that is to say, the top of the snout, is covered with smaller plates irregularly disposed.

Mr. Yarrell observes that when separating the skin from the muscles of the back, the fibres (described by Dr. Harlan) by which the outer coat was attached in the line of the vertebræ were found to be adherent to the muscles immediately investing the spinous processes, and each of them, Mr. Yarrell supposes, probably affords a nidus for vessels nourishing the external covering; but these attachments did not extend below the dorsal vertebræ. Proceeding from thence forwards, the great size of the muscles of the scapulæ and neck was apparent, filling up the whole space, the back and upper portion of the head forming one continued line. The thick plate of scales covering the frontal portion of the head was without difficulty separated from the surfaces of the singular bony processes of the os frontis; the projecting cartilaginous portion of the nose was removed with the skin, and the tendons of several muscles giving motion to the snout were cut through.

The hinder portion of the body still remained to be separated from the skin, and this was found to be a matter of some difficulty. The posterior and inferior portions of the sacrum on each side were firmly united by distinct attachments, differing in form, to certain scales of the truncated extremity of the outer covering.

The necessity of preserving this outer covering entire rendered a division of these portions of bone necessary, and from the particular form of the part, this was attended with some hazard, but was ultimately accomplished without injury, the bones being cut through as near to, and as parallel with, the inner surface of the plates, as their confined situation would admit. The covering of the tail was separated from the vertebræ as far as the flattened extremity, where the greater elongation of the transverse processes of the last four vertebræ, and the tenuity of this flattened portion, made further separation difficult. The tail was then divided between the tenth and eleventh vertebræ, and both parts of the animal entirely separated.

On the inner surface of the removed skin were two long, broad, and thin muscles, extending the whole length of the back; each muscle was divided, as it approached the shoulder, into two portions; the outer one was attached to the superior and greater spine of the scapular bone, the inner and longer slip proceeded forwards, and was inserted into the transverse occipital ridge. The posterior extremity of each muscle was attached to the superior edge of the spine of the ilium.

External Ear.—This, according to Dr. Harlan, consists of a circular, somewhat patulous opening, directly posterior to the eye, surrounded with an elevated margin, and communicating with a bony canal.

Eye.—Minute, totally black; and, like the ear, nearly hidden by long silky hair.

Mouth.—Gape small.

Nose.—Furnished with an enlarged cartilage, as in the hog; the anterior nares opening downwards at the inferior border.

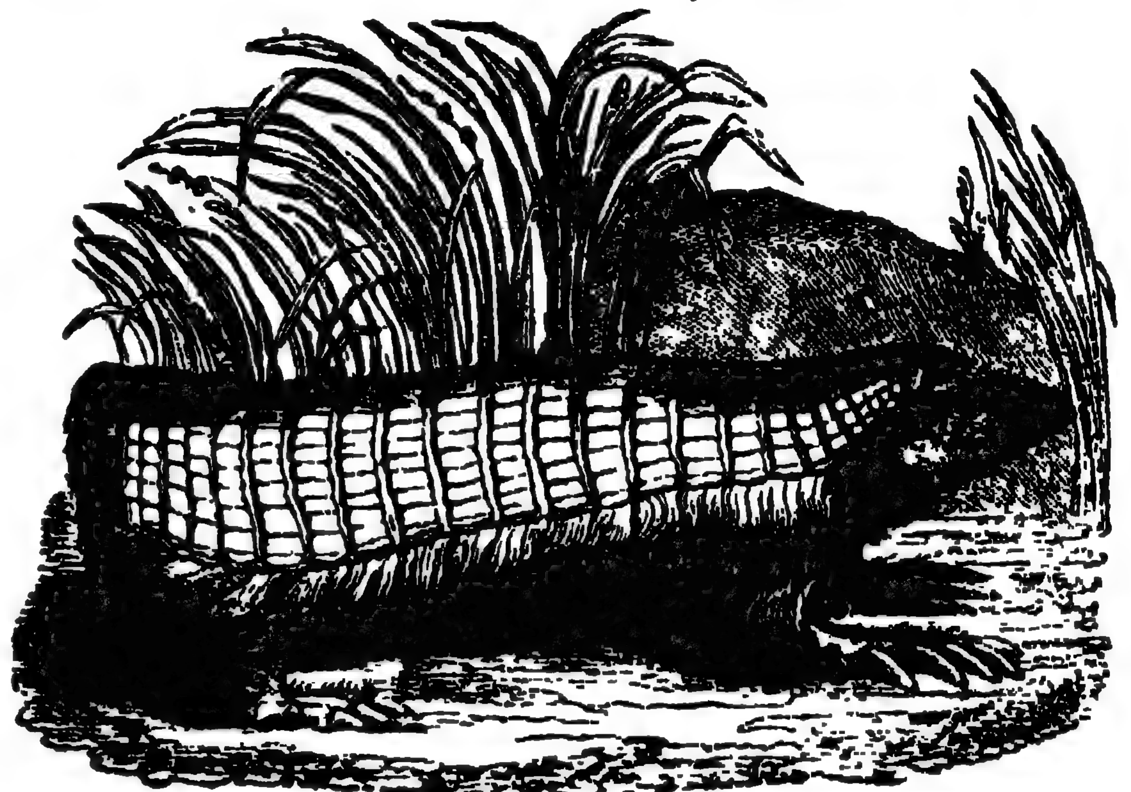
The whole surface of the body is, it appears from the same author, and the correctness of his description is proved by an inspection of the stuffed specimen, covered with fine silk-like hair, longer and finer than that of the mole, but not so thick set. The anterior of the chest is large, full, and strong; the anterior extremities short, clumsy, and powerful; the hair is continued for some distance on the palm—the phalanges of the hand united; five powerful nails rising gradually one above the other; the external shortest and broadest; the whole so arranged as to form a sharp cutting instrument, rather scooped, very convenient for progression under ground, and such as must very much impede motion on the surface. Hind legs weak and short; feet long and narrow; the sole resembles considerably the human foot, having a well defined heel, which rests flat upon the ground, and being arched in the middle, toes separate, nails strong.

In the specimen dissected by Mr. Yarrell, the abdomen and thorax had been opened throughout their whole length, and the viscera from both cavities had been entirely removed. Adhering to the skin lining the truncated portion of the animal, were two sacs which had been lodged in cavities on each outer side of the sacrum, immediately under the superior projection, made evident by the corresponding depression in the investing muscle of that part. These globular bags were lined with a secreting surface, but having suffered some mutilation in removal, the mode by which the secretion passed, or its particular use, could not be ascertained. Mr. Yarrell thinks that they are probably analogous to the well-known anal glands of various other quadrupeds.

Sexual Organs.—The sex, in the specimen dissected by Mr. Yarrell, was evident from the penis remaining attached to one edge of the divided abdominal muscles; and, lying quite loose in the cavity of the abdomen, was found one of the testes, but whether its original situation had been internal or external to the parietes, could not be ascertained. The penis itself was large compared to the size of the animal, and one inch and one-eighth in length. The confined situation of the female sexual organ, in Mr. Yarrell's opinion, probably renders such a provision necessary, the truncated portion of the coat of mail covering the whole of the posterior extremity.

We must refer the reader for further particulars to the papers of Dr. Harlan and Mr. Yarrell, both of which are to be found in the 'Zoological Journal' (vols. ii. and iii.).

Habits. According to Mr. Closeberry the habits of *chlamyphorus* resemble those of the mole, as it lives for the most part under ground. He adds that the animal is reputed to carry its young beneath the scaly cloak with which it is covered, and that the tail possessed little or no motion. The carrying the young in the manner described may be considered apocryphal till further evidence is obtained*



[Chlamyphorus truncatus.]

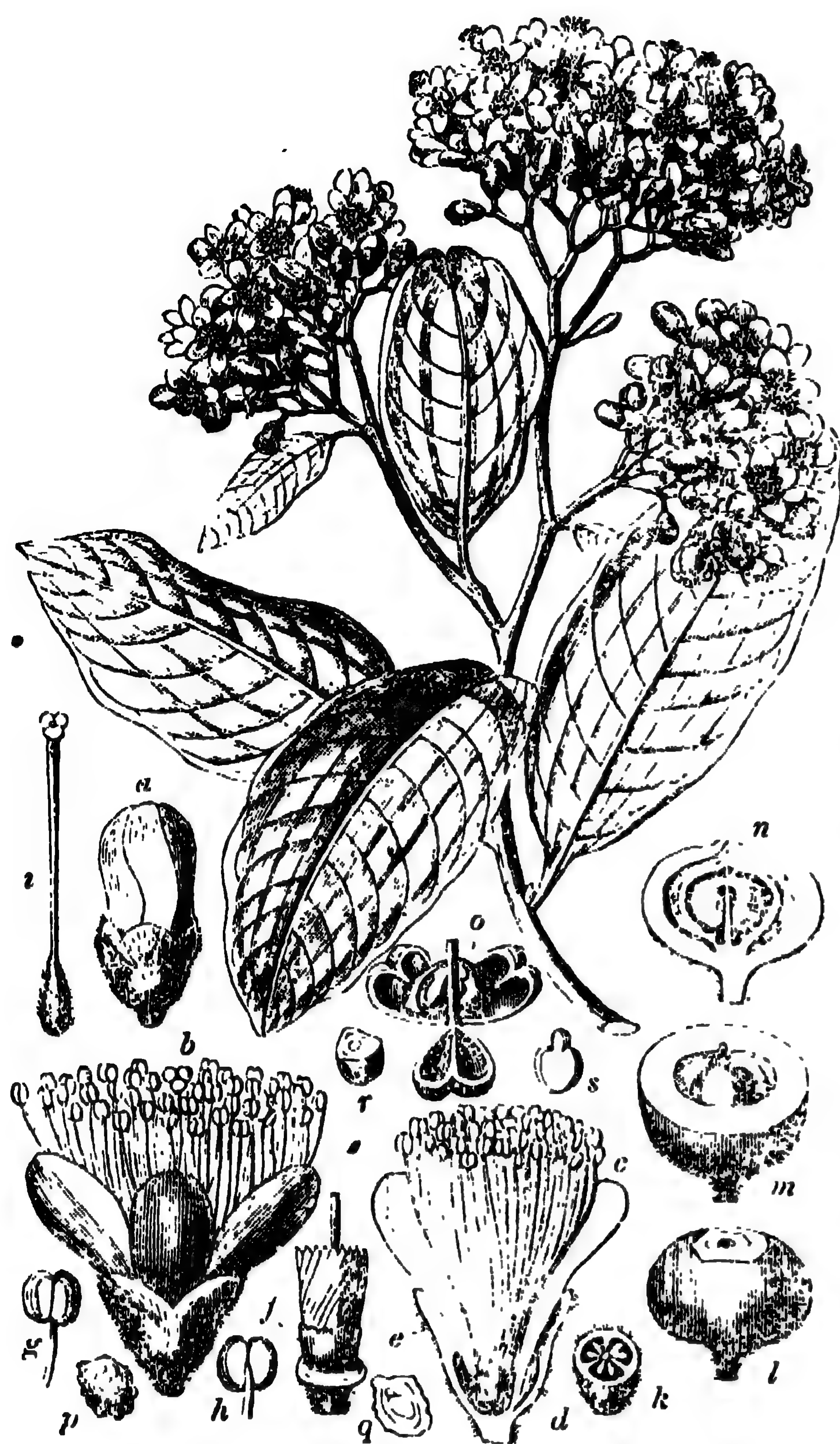


[Truncated extremity and tail.]

CHLAMYS. [CHRYSOMELIDÆ.]

CHLEN'ACEÆ, a natural order of polypetalous exogens, by some accounted an ally of Malvaceæ, but more correctly referred to the vicinity of Cistaceæ, from which, and all those associated with them in the Gynobasic group, they differ in having an involucrum to each calyx, or to each pair of calices: they are handsome trees or shrubs, but of no known use; their leaves are alternate and undivided, their stipules deciduous, and their flowers in panicles or racemes, always showy, and often red. The whole of them are wild in Madagascar.

* The osteological figures are taken from Mr. Yarrell's Memoir.



[Sarcolæna multiflora.]

a, flower-bud; *b*, flower; *c*, vertical section of flower; *d*, the calyx; *e*, the involucrum; *f*, base of the flower, showing the spiral tube formed by the union of the filaments; *g*, *h*, back and front views of anthers; *i*, pistil; *k*, transverse section of ovary; *l*, fruit; *m*, transverse section of fruit; *n*, vertical section of fruit; *o*, pericarp, splitting and discharging its seed; *p*, seed; *q*, vertical section of seed; *r*, transverse do.; *s*, embryo.

CHLOEIA. [Dorsibranchiata.]

CHLORAL, a liquid prepared by Liebig with chlorine and alcohol, from the first syllables of which words its name is derived. To form it, a current of dry chlorine gas is passed into anhydrous alcohol, at first kept cool, but afterwards sufficiently heated to expel the hydrochloric acid formed. During the action of these substances one portion of the chlorine unites with the hydrogen of the alcohol to form hydrochloric acid, and another portion with its oxygen and carbon to constitute chloral. When the operation has been long continued, a liquid of the consistence of a syrup is procured, which afterwards becomes solid; it is a hydrate of chloral containing some undecomposed alcohol and a portion of hydrochloric acid. It is then to be shaken with concentrated sulphuric acid, which combines with the water, and the chloral rises in a fluid state to the surface; this is to be mixed with lime, and by distillation the chloral is obtained free from hydrochloric acid.

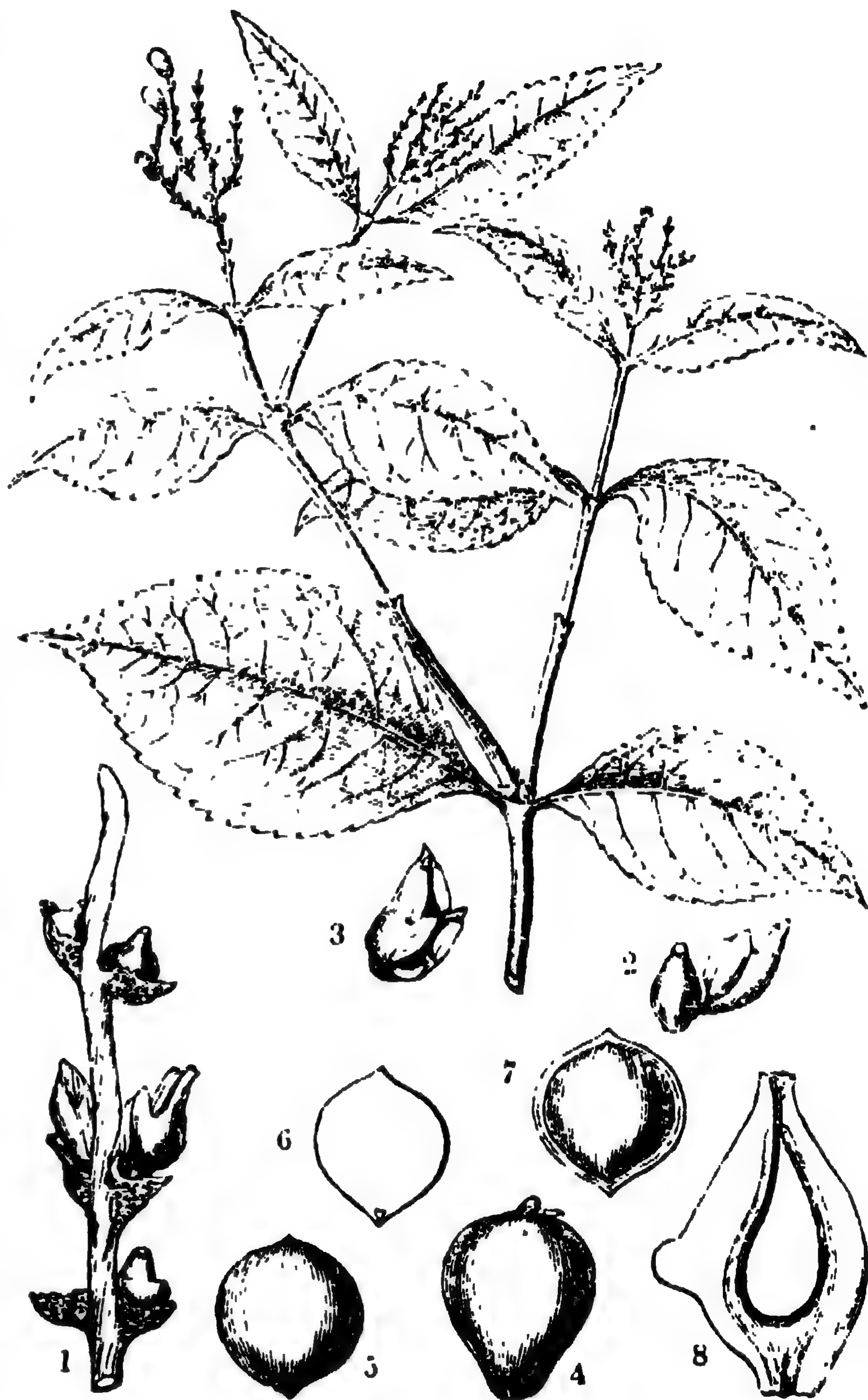
Chloral is a colourless transparent oily-looking fluid; its smell is pungent, and its taste but slight; its specific gravity is 1·502; at about 200° Fahrenheit it boils, and the vapour condenses unchanged. Water when warmed dissolves chloral, but when mixed with a small quantity of it, they combine, when agitated, into a solid crystalline hydrate. It combines with bromine, iodine, and sulphur; when its vapour is passed over lime heated to 212°, it is decomposed, oxide of carbon is evolved, and chloride of calcium, mixed with a little charcoal, remains; by solution of potash or soda it is also decomposed, and a chloride of carbon is formed.

Chloral consists of

Six equivalents of	chlorine	36 × 6	=	216
Four ,,	oxygen	8 × 4	=	32
Nine ,,	carbon	6 × 9	=	54
				302

CHLORANTHACEÆ, a natural order of achlamydeous exogens, allied to the Peppers, and, like them, having an aromatic fragrant odour: they are known from the orders associated with them by their jointed stems and opposite leaves, with intermediate stipules. Their flowers grow in naked spikes, and consist of an ovary next the axis of inflorescence, and a fleshy anther on the outside. Chloranthus officinalis is reckoned a stimulant of the highest order.

(See Blume, *Flora Javæ*, and Lindley's *Natural System*, p. 183.)



[Chloranthus officinalis.]

1, spike, the upper and lower flowers without stamens; 2, flower without its bract; 3, an interior view of the anther; 4, a magnified fruit; 5, the kernel of the fruit; 6, a section of the fruit, showing the embryo; 7, the stone of the fruit, with a portion of the shell removed; 8, a perpendicular section of the ovary, showing the position of the ovule.

CHLORIC ACID. [Chlorine.]

CHLORIDES OF CARBON. [Chlorine.]

CHLORINE, an elementary gaseous body discovered by Scheele in 1774, while examining an ore of manganese. He gave it the name of dephlogisticated marine acid. By the French chemists, in accordance with the views of Berthollet, it was called oxygenized muriatic acid, which was shortened by the English chemists to oxymuriatic acid: these latter terms meant that it was a compound of muriatic acid, a supposed elementary or at any rate an undecomposed body, and oxygen. Gay-Lussac and Thénard in 1809 published some experiments from which they inferred that oxymuriatic acid might be a simple substance, but they notwithstanding adhered for a considerable period to the opinion of its being a compound. About the same time Sir H. Davy commenced his examination of the same body, and from his numerous researches he concluded that it ought to be regarded as an undecomposed body; and on account of its green colour, he gave this gas the name of

chlorine. This opinion was at first strongly combated by Dr. Murray and Berzelius, but the latter is now a convert to what has been termed the new theory of chlorine. Chlorine was first obtained by Scheele, by treating the binoxide of manganese with muriatic acid. During the mutual operation of these compound bodies, the oxygen of the binoxide combines with the hydrogen of the acid, and water is formed; the metal of the oxide remains combined with a portion of the chlorine, while the excess which the metal does not unite with is given out in the gaseous state, and possesses the following properties: it is of a greenish colour, and hence the name chlorine, from χλωρός (chlorus), green; it has a very powerful and disagreeable odour, is very suffocating, even when considerably diluted with air, and its taste is astringent. According to Davy, 100 cubic inches weigh between 76 and 77 grains at the average temperature and pressure, and with this determination the experiments of Gay-Lussac and Thénard nearly agree; its specific gravity is consequently about 2·7. Mr. Faraday found that when this gas is subjected to a pressure of about four atmospheres, and kept cool, it is condensed into a yellow limpid fluid, which is extremely volatile, and which, when the pressure is removed, rapidly reassumes the gaseous form; its specific gravity is about 1·33; its refractive power is less than that of water; and it is a non-conductor of electricity.

Chlorine gas is absorbed and dissolved by water, and when this fluid has been recently boiled, it will take up twice its bulk of the gas at common temperatures and pressure: the aqueous solution has the colour, smell and taste of the gas itself. The equivalent of chlorine is 36, and when moist chlorine gas is exposed to a temperature of 32° Fahr., yellow crystals are formed, which are hydrate of chlorine, consisting, according to Mr. Faraday, of very nearly 1 equivalent of chlorine = 36 + 10 equivalents of water = 90. Neither light, heat, nor electricity, produces any change in the properties of chlorine gas, provided it be dry; but if it be moist, then light causes it to decompose the water, the hydrogen of which combines with it to form muriatic acid, while the oxygen is evolved in the gaseous form; and it was this experiment which chiefly induced Berthollet to adopt the opinion of its nature which has already been explained. In the decomposition of the compounds which contain it, it is evolved like oxygen at the positive pole, or anode; except when separated from oxygen, and then it goes to the negative or cathode.

One of the most curious and important properties of chlorine is the power which it possesses of destroying the colour of animal and vegetable matter in general, and hence its extensive application to the purpose of bleaching. [BLEACHING.] When acids alter vegetable colours, they may in many cases be restored by the application of an alkali; but so complete is the destructive power of chlorine, that nothing whatever can reproduce the colour which it has removed. This power appears however to depend upon the intermediate action and decomposition of water, for dry chlorine gas produces no bleaching effect. It follows therefore, that its decolouring power is not direct, but intermediate, dependent upon its decomposing water, and combining with its hydrogen to form muriatic acid, while the nascent oxygen of the water produces the bleaching effect.

Chlorine gas, like oxygen, is a powerful supporter of combustion. If certain metals, and especially antimony, in the state of powder, be thrown into chlorine gas, they burn spontaneously; phosphorus also exhibits similar phenomena.

Chlorine is also a powerful disinfectant; for this purpose it was first employed by Guyton de Morveau, and within a few years compounds of chlorine, or perhaps of chlorous or hypochlorous acid (for the question is undecided), and lime or soda, have been extensively used for this purpose.

Chlorine is in general easily detected by its odour and colour, whether in its gaseous state or in solution in water. It occasions a white precipitate in solution of nitrate of silver, which speedily darkens by exposure to light. This compound is called chloride of silver, and was formerly known by the names of horn silver or muriate of silver. In this case however a portion only of the chlorine is thrown down; part of it uniting with the oxygen of the oxide of silver forms chloric acid, of which we shall presently make mention. It will be observed from the above statement that those compounds which contain chlorine are called chlorides; but this is the case only when such compounds do not possess acid properties.

Chlorine combines with almost every other elementary body, forming compounds of great importance; we shall first state the nature of those to which it gives rise by uniting with oxygen.

Oxygen and chlorine combine in several proportions, but the combination is never immediate; and different views of the number and nature of the compounds are entertained by different chemists. Thus Berzelius mentions one oxide and three acids, viz.,

Protoxide of chlorine composed of	2	vols. of chlorine	+ 1	vol. of oxygen.	
Chlorous acid	,,	2	,,	,,	+ 4 ,, ,,
Chloric acid	,,	2	,,	,,	+ 5 ,, ,,
Oxychloric acid	,,	2	,,	,,	+ 6 ,, ,,

Berzelius however admits that there probably exists a peroxide of chlorine composed of equal volumes of chlorine and oxygen, though it has never been obtained. Count Stadion, who discovered oxychloric acid, supposes it contains seven volumes of oxygen instead of six, as above.

Dr. Thomson gives

Protoxide of chlorine composed of	2	vols. of chlorine	+ 1	vol. of oxygen.	
Quadroxide of chlorine	,,	2	,,	,,	+ 4 ,, ,,
Chloric acid	,,	2	,,	,,	+ 5 ,, ,,
Perchloric (oxychloric) acid		2	,,	,,	+ 7 ,, ,,

Dr. Turner agrees with the last statements, which indeed differ from those of Berzelius only with respect to oxychloric acid. Dr. Turner however calls the chlorous acid of Berzelius, which is the quadroxide of Dr. Thomson, peroxide of chlorine. According however to Soubeiran, the supposed protoxide of chlorine is a mere mixture of the peroxide and chlorine. The late experiments of Balard seem to prove the existence of what he calls hypochlorous acid, formed of two volumes of chlorine and one volume of oxygen, which is the composition assigned, as just noticed, to the protoxide. Balard remarks, that if both analyses be correct it would be an additional case of isomerism; but he seems rather inclined to adopt the opinion of Soubeiran with respect to the so-called protoxide of chlorine. Leaving however these uncertainties for the present, we shall describe the various compounds above mentioned. As no doubt exists with respect to its composition, and also for other reasons, we begin with

Chloric Acid. It has been already mentioned that oxygen and chlorine do not combine by direct action; when however chlorine meets with nascent oxygen they unite. If chlorine gas be passed into water containing oxide of silver diffused through it, a portion of the chlorine combines with the silver and forms a chloride, which is precipitated; and the oxygen expelled from it uniting with another portion of chlorine, constitutes chloric acid, which remains in solution. Any excess of chlorine is to be expelled by heat. Or chloric acid may be made by adding dilute sulphuric acid to chlorate of barytes, in which case sulphate of barytes is precipitated, and chloric acid remains in solution. It is a colourless inodorous acid, which has a sour taste, and reddens vegetable blue colours. The solution may be concentrated by a gentle heat till it acquires an almost oily consistence; it has then a yellowish tint, a peculiar odour, and it sets fire to dry vegetable matters. It combines with bases to form salts termed *chlorates*, which were formerly known by the name of oxygenized muriates, or hyper or oxymuriates. Bodies which have a strong affinity for oxygen decompose chloric acid, by separating that element; thus sulphurous acid is converted into sulphuric acid by decomposing it, and taking its oxygen. Chloric acid is composed of

1 equivalent of chlorine	=	36
5 equivalents of oxygen	=	40
		76

The chlorates, except that of potash, are not important salts: this however is used for many purposes; thus when it is heated it evolves very pure oxygen gas, and chloride of potassium remains; the oxygen is yielded both by the acid and the alkali. Chlorate of potash [POTASSIUM] is prepared on the large scale by passing chlorine gas into a solution of the alkali; part of the chlorine takes oxygen from part of the potash and forms with it chloric acid, which unites with the remainder of the potash to form the chlorate, while the remainder of the chlorine unites with the potassium to form chloride; both salts dissolve in water, but the

chlorate crystallizes first, and in rhombic plates. This salt detonates when triturated with sulphur; and when struck with phosphorus it explodes and inflames, and in both cases it yields oxygen.

Chlorate of potash is composed of

1 equivalent of chloric acid	=	76
1 equivalent of potash . .	=	48
Equivalent . . .		124

Oxychloric or *Perchloric Acid* is procured by the partial decomposition of the chloric acid just described. It is obtained by mixing sixty grains of chlorate of potash with about four times its weight of sulphuric acid, and heating the mixture below 212° in a glass retort; a gas, which we shall presently describe, is given out, and there remains in the retort a mixture of bisulphate and oxychlorate of potash; by washing with cold water the bisulphate is dissolved, and the oxychlorate remains. When this salt is mixed in a retort with half its weight of sulphuric acid diluted with one third of water, and the mixture is heated to about 280°, the white vapour which arises is oxychloric acid, which condenses in the receiver.

This acid is a limpid colourless liquid, has a sharp taste, and reddens litmus paper, without destroying its colour. When concentrated by evaporation its specific gravity is 1·65, and it then emits vapour when exposed to the air; it boils at 392°, and rapidly absorbs moisture from the atmosphere. When mixed with sulphuric acid and heated, the acid is distilled, and it concretes on cooling into a solid, which crystallizes in prisms. It appears to be the most stable of all the compounds of chlorine and oxygen, not suffering decomposition either by the action of light, sulphurous, or hydrosulphuric acid; it dissolves iron and zinc, with the evolution of hydrogen gas.

The salts formed by this acid into bases are termed oxychlorates or perchlorates: the first is the better name; they are decomposed by heat, yielding much oxygen gas, and are converted into chlorides. The oxychlorates are not an important class of salts.

Peroxide of Chlorine, the chlorous acid of Berzelius, is a gaseous compound evolved during the formation of oxychlorate of potash just described. This gas has a green colour; it has no smell of chlorine, but, on the contrary, an aromatic odour; it is readily dissolved in water, to which it imparts its own colour; the solution does not act upon mercury, nor does it combine with alkalis; it destroys most vegetable blue colours without previously reddening them. When heated to 212° this gas explodes violently, emits a strong light, and the residual gases occupy more space than the compound did which they formed; 40 volumes of the gas becoming 60, of which 40 are oxygen and 20 chlorine.

The changes which occur in thus preparing oxychlorate of potash and peroxide of chlorine are these: the sulphuric acid decomposing a portion of the chlorate of potash evolves chloric acid, which, at the moment of its liberation, is separated into oxygen and peroxide of chlorine; the oxygen combines with the chloric acid of the undecomposed chlorate, and converts it into oxychloric acid, and consequently oxychlorate of potash is formed, while the peroxide of chlorine, as already noticed, is evolved in the gaseous state. It is probable, that when three equivalents of chlorate of potash are acted upon by sulphuric acid, there are produced two equivalents of peroxide of chlorine and one equivalent of oxychloric acid.

Protoxide of Chlorine, the euchlorine of Davy, by whom it was discovered in 1811 This gas is obtained by exposing very cautiously to a moderate heat two parts of chlorate of potash, one of muriatic or hydrochloric acid, and one of water; the products are water, chlorine, and the protoxide of chlorine. The gases should be received over mercury, which absorbs the chlorine and leaves the protoxide.

This gas has a yellowish green colour, more brilliant than that of chlorine; its smell resembles that of burnt sugar; water dissolves eight or ten times its volume of this gas, and becomes nearly of an orange colour. It does not combine with alkalis, but it first reddens vegetable blues, and afterwards destroys them: this gas is very explosive, even the heat of the hand is sufficient to produce this effect. According to Soubeiran, as already noticed, this gas is not a definite compound, but a mixture of peroxide of chlorine and chlorine, and it has been also observed, that Balard's experiments tend to show that the portions of oxygen and chlorine assigned to this compound are such as form hypochlorous acid, which we shall now mention; protoxide of chlorine will therefore be probably removed from the compounds of these elements.

Hypochlorous Acid, to which we have just alluded, is, according to Balard, an acid existing in what is usually called chloride of lime or bleaching powder; and this, as the first-mentioned name indicates, was first supposed by Berzelius to be a chloride of lime, and afterwards a chlorite; but the more recent and minute researches of Balard seem to prove that it is a hypochlorite. This acid is thus obtained: add finely-powdered peroxide of mercury, mixed with twelve times its weight of distilled water, to chlorine gas in a bottle, and shake it well; the oxide of mercury should be slightly in excess, so as that when the absorption of the chlorine, which goes on rapidly, is over, the residue should have a reddish rather than a white colour. The whole contents of the bottle are to be put in a filter, upon which there remains oxychloride of mercury, while the filtered liquor, when distilled in vacuo, yields weak hypochlorous acid, which may be concentrated by redistillation.

Hypochlorous acid thus procured is a transparent slightly yellow coloured fluid; its smell is penetrating and very distinct from that of chlorine or the peroxide; its taste is extremely strong but not acid. It attacks the epidermis with great activity, even more so than strong nitric acid, and imparts a brown stain to the skin. It is a very unstable compound, decomposing probably even at common temperatures. In hot weather it can be preserved for a few days only, without immersion in ice; when weaker and kept from the light, it may be preserved for a longer time. During decomposition it gives out small bubbles of chlorine gas, and some chloric acid is formed, and this decomposition is accelerated by agitation with angular bodies: it is decomposed by the action of light as well as by that of heat.

When to a concentrated solution of hypochlorous acid an equal bulk of solid dry nitrate of lime is added, a brisk effervescence is produced, which is owing to the separation of pure hypochlorous acid gas, which has the following properties: its colour is very little deeper than that of chlorine; its smell is penetrating like that of the solution; it is completely absorbed by mercury, which is transformed into a red oxychloride. It is best prepared by passing up a little of the gas at a time into a jar filled with and inverted in mercury; the nitrate of lime which is dissolved prevents the action of the liberated gas upon the metal; water dissolves nearly 100 times its volume of this gas; it is decomposed by heat with explosion. The fixed alkalis and the alkaline earths combine with hypochlorous acid.

The hypochlorite of lime, usually called chloride of lime, or bleaching powder, is a compound of great importance, both in the arts [BLEACHING] and as a disinfectant. It is prepared by exposing hydrate of lime to the action of chlorine gas, when a large quantity of it is absorbed, and the result seems to be the formation of chloride of calcium and hypochlorite of lime; the exact composition of bleaching powder is however a subject still under discussion. Another compound, the nature of which is still more problematical, is that formed by passing chlorine gas into a solution of carbonate of soda; the gas is plentifully absorbed without evolving any carbonic acid. This compound, like the hypochlorite of lime, is used as a disinfectant, under the name of Labarraque's soda liquor.

Azote and chlorine combine to form the

Chloride of azote, or more correctly the quadrichloride of azote. This compound was discovered by Dulong in 1811. These gases do not combine by direct action, but when chlorine gas meets azotic gas in the nascent state they unite. It may be prepared by dissolving an ounce of muriate of ammonia in twelve to sixteen times its weight of water, and then inverting a bottle of chlorine gas in the solution. The chlorine is gradually absorbed, and there are gradually formed small drops of an oil-like fluid which sink in the solution: these are the chloride of azote, derived from the combination of the chlorine with the azote of the ammonia.

The properties of this substance are that it is extremely explosive, sometimes detonating spontaneously, but always on the contact of fatty matter, phosphorus, and various other bodies. Its specific gravity is 1·653. It is not soli-

dified by the most intense artificial cold. At 160° it may be distilled, but at 200° to 212° it explodes. The products of the explosion are four volumes of chlorine and one volume of azote, and as these represent equivalents, it is a quadrichloride of azote composed of

4 equivalents of chlorine 36 × 4	=	144
1 equivalent of azote	=	14
Equivalent		158

Chlorine and hydrogen combine to form the

Hydrochloric Acid, commonly called the muriatic acid: when equal volumes of these gases are mixed and kept in the dark, they do not unite, but if exposed to daylight they combine slowly, and by the direct rays of the sun, the electric spark, or a taper, they unite with explosion, and there is formed a quantity of muriatic acid equal in volume to that of the two gases employed. As 50 cubic inches of hydrogen weigh 1·075 grain, and 50 of chlorine 38·07 grains, their combined weight gives that of 100 cubic inches of the gas, = 39·145 grains, or its specific gravity is 1·228. This gas is colourless, has a very pungent odour, and an acid and acrid taste. It excites coughing, unless largely diluted with air; extinguishes burning bodies when they are immersed in it; and reddens vegetable blue colours strongly. By heat it is merely expanded, but by electricity it is decomposed. The affinity of this gas for water is so great, that when it escapes into the air, it forms a white vapour by combining with atmospheric moisture: water absorbs 400 times its bulk of this gas, and the result is liquid muriatic acid, usually called muriatic acid.

As this acid is largely employed, it is prepared in a more economical manner than the direct formation of the gas, by decomposing common salt with sulphuric acid. For this purpose, 24 parts of common salt, termed chemically chloride of sodium, are mixed in a retort with 20 parts of sulphuric acid, and 12 of water, and into the receiver an equal quantity of water is put; by distillation to dryness, a colourless acid is obtained, which has a specific gravity of about 1·16.

During the mutual action of the salt, acid, and water, a portion of the water is decomposed, which yields hydrogen to the chlorine, and these form muriatic acid, while its oxygen unites with the sodium, to form soda, which with the sulphuric acid constitutes sulphate of soda, which remains in the retort. This solution of muriatic acid has the smell and acid properties of the gas itself: it emits white fumes, and reddens litmus paper. It dissolves many metals, such as iron, zinc, and tin, and forms with them chlorides, the acid being decomposed and yielding hydrogen gas during their solution. These compounds will be treated of as chlorides, under the respective metals. Muriatic acid is largely employed in the arts connected with, or dependent upon, chemical operations, as in dyeing and calico printing, and in making muriate of ammonia, or sal ammoniac [AMMONIA]; it unites also with the vegetable alkalis, as morphia, quina, &c., to form muriates; but with metallic oxides, and with the earths, which indeed are so, strictly speaking, it forms chlorides, and not muriates, on account of the decomposition which it suffers, as just explained. When mixed with the nitric acid also, it is decomposed, and a solution of chlorine is obtained, which is used under the name of *aqua regia*, or nitro-muriatic acid, for dissolving gold and platinum.

Chlorine unites with several of the non-metallic bodies; [BROMINE, IODINE, PHOSPHORUS, SELENIUM, and SULPHUR]. Having already given an account of boron and carbon, we shall briefly state the nature of the chlorides of these elementary bodies.

Chlorine and boron form

Chloride or perhaps *terchloride of boron*. It was found by Davy that boron, when recently prepared, burns in chlorine gas; Berzelius remarked that if the boron be previously rendered compact, combustion does not occur until these elements are heated. The resulting compound is a colourless gas, which, when freed from excess of chlorine by means of mercury, has the following properties: it is colourless; its specific gravity is 3·942; it is readily soluble in water, by decomposing a portion of which muriatic and boracic acids are obtained: the same effect is produced, accompanied with a white vapour, when the gas escapes into the atmosphere. It combines with ammonia to form a compound, the nature of which has not been examined. Dr. Thomson calls it borochloric acid.

It has been supposed to be a terchloride, but the subject requires further investigation.

Chlorine and carbon form four different chlorides; viz. the dichloride, protochloride, perchloride, and $\frac{5}{4}$ chloride. No combination can be effected between these elements by direct action; carbon, even heated to whiteness in the gas, does not form any compound with it. The discovery of these compounds is due to Mr. Faraday. (*Phil. Trans.* 1821.)

The dichloride of carbon was an accidental product which has been only once obtained, and was formed during the preparation of nitric acid from crude nitre and sulphate of iron. It occurred in small soft colourless fibres; it fused when heated, and at 250 sublimed and condensed unchanged. It is insoluble in water, acid, and alkalis, but may be dissolved in hot oil of turpentine and in alcohol, recrystallizing as the solutions cool; it burns with a red flame, yielding much smoke and muriatic acid vapour. It is composed of

1 equivalent of chlorine	. .	36
2 equivalents of carbon	.	12
Equivalent	. . .	48

The *perchloride of carbon*, which it will be most convenient, although not in strict order, to consider next, is composed of

3 equiv. of chlorine	108, or	$1\frac{1}{2}$ equiv.	54
2 „ carbon	12 „	1 „	6
Equivalent .	120	Equivalent	60

As a sesquichloride.

When olefiant gas, a compound of hydrogen and carbon [CARBON], is mixed with chlorine, they combine to form an oil-like liquid which is composed of chlorine, carbon, and hydrogen; by exposure to the direct rays of the sun, muriatic acid and chloride of carbon are formed during its decomposition.

This chloride is solid; its smell is rather aromatic; it is a non-conductor of electricity; its specific gravity is 2. It melts at 320°, and at a higher temperature may be distilled without suffering any change; water dissolves it but sparingly, and it is also soluble in alcohol, æther and oils.

It burns when strongly heated, but is not acted upon either by acids or alkalis; when passed with hydrogen through a red-hot tube, muriatic acid is formed and carbon deposited.

The protochloride of carbon is obtained by passing the perchloride in vapour through a red hot porcelain tube; chlorine gas escapes in such proportion as to reduce the perchloride to a protochloride, which is a limpid colourless liquid of specific gravity 1·552: it is not solidified at 0° Fahr. and at about 170° is vaporized. When repeatedly distilled it suffers no change. It is composed of

1 equivalent of chlorine	.	36
1 „ carbon	.	6
Equivalent .	.	42

The last is the $\frac{5}{4}$ chloride; it may be formed by distilling a mixture of 8 parts of chloride of lime, 12 of water, and 1 to $1\frac{1}{2}$ part of alcohol.

The chloride of carbon, which results from the mutual action of these substances, is a colourless limpid fluid; its specific gravity is 1·48, and it boils at 141° Fahr. It does not readily burn, and acids and alkalis, when moderately heated, act but little upon it.

It is insoluble in water, but dissolved by alcohol and ether. It is not decomposed by potassium. Like the other chlorides of carbon it is decomposed by being passed over ignited oxide of copper, and its composition, as well as that of the preceding, was thus ascertained.

The $\frac{5}{4}$ chloride of carbon is composed of

5 equivalents of chlorine		180
4 „ carbon	.	24
Equivalent .	.	204

Medical Uses.—Chlorine, when pure and concentrated, is very deleterious; it acts as an irritant poison. Its action is most violent and speedy when it is brought into contact with the respiratory organs; it then occasions such violent spasm of the glottis, or opening of the windpipe, that instant death may ensue. To enable chlorine to pass this orifice it

must be very largely diluted with atmospheric air, or aqueous vapour. A strong solution of it introduced into the stomach causes irritation, inflammation, and death: and even a stream of the gas, or aqueous vapour of it, directed upon the skin, will cause a pricking or stinging sensation, followed by an eruption of pimples or even vesicles. Notwithstanding its formidable properties, it has been used in several cases with such success that no adequate substitute can be found for it. As a disinfecting agent, or means of decomposing and rendering innoxious putrid miasmata, and other sources of disease, it is unrivalled. For this purpose it may either be directly mingled with the air of the infected place, by preparing it on the spot, or by means of one of Morveau's disinfecting bottles; or it may be gradually liberated from some of its combinations, such as the chloride of soda or lime. This last method is best when human beings remain in the apartment; but the former is preferable, when they have been removed, for purifying the wards of hospitals, cells of gaols, or holds of ships. When not in a very concentrated form, the respiratory organs become habituated to breathing it, and the workmen in manufactories where it is used enjoy a marked immunity from epidemic fevers, and attain a considerable age.

From having been observed to allay chronic cough existing among the workmen of certain manufactories, it has been proposed to be inhaled in a diluted state in several chronic affections of the lungs, such as asthma, chronic bronchitis, and even phthisis pulmonaris, or consumption. In the two former it is of some utility, in the latter it is a mere palliative, but is attended with the advantage of destroying the fœtor of the breath, which is distressing both to the patient and attendants. The chlorine employed in this way must be extremely pure, the preparation frequently renewed, of uniform strength of 1½ volume of chlorine in solution, and carefully preserved from the sun-light, which decomposes it. It may be breathed in a small quantity out of a proper apparatus four or five times a day.

A weak solution of chlorine has been employed, introduced into the stomach, with considerable success in indigestion, with loss of appetite, loaded tongue, and foul taste in the mouth.

Its employment in the form of a bath is not common, but occasionally useful, from its irritant effect on the skin. It is doubtful whether it possesses the specific effect upon the liver which some ascribe to it.

In case of poisoning by the gas, inhaling ammonia or sulphuretted hydrogen in small quantity is useful. Should an overdose of the solution be swallowed, chalk, magnesia, or other alkali, or white of egg in water, or a draught of milk, would be proper as an antidote. On the opposite hand, chlorine is said to be a valuable antidote in case of poisoning by hydrocyanic (prussic) acid, sulphuretted hydrogen, or hydrosulphate of ammonia.

CHLORIODIC ACID. [IODINE.]

CHLO'RION, a genus of Hymenopterous insects, of the section *Fossores*. [SPHEGIDÆ.]

CHLORITE. [TALC.]

CHLOROCARBONIC ACID GAS. This acid, called by Dr. Davy, who discovered it, *phosgene gas* (from φῶς light, and γεννᾶν to produce), was formed by exposing a mixture of equal volumes of dry chlorine and carbonic oxide gases to the solar rays; combination takes place rapidly, but without explosion, and they contract to half their bulk; day-light produces the effect slowly, but in the dark it does not take place at all.

Chlorocarbonic acid gas is colourless; has a strong smell, and reddens litmus paper even when dry; it decomposes water, and there are formed hydrochloric and carbonic acid. Several metals when heated in it decompose it; they are converted into chlorides, and carbonic acid is evolved. The specific gravity of this gas is about 3·44; 100 cubic inches weigh about 107 grains; it consists of one equivalent of chlorine 36 + 1 equivalent of oxide of carbon 14 = 50. When mixed with ammoniacal gas it condenses four times its volume, and forms chlorocarbonate of ammonia, which is a white solid salt; when dissolved in the stronger acids it yields muriatic and carbonic acid, but nitric acid dissolves it without effervescence. It is a disalt composed of

1 equivalent of chlorocarbonic acid .	50
2 „ ammonia . . .	34
Equivalent . . .	84

No other chlorocarbonates are known.

CHLOROCYANIC ACID. [CYANOGEN.]

CHLOROFORME, a peculiar compound fluid, obtained about the same time by Soubeiran and Liebig. To procure it distil a mixture of alcohol and a solution of chloride of lime; separate the product from the liquid distilled with it, shake it with five or six times its volume of concentrated sulphuric acid; pour it off, mix with a little sulphuric acid, distil, and rectify from a little chloride of calcium.

Chloroforme is a limpid fluid: its specific gravity is 1·480, it boils at about 141° Fahrenheit; does not readily burn, but when a glass rod moistened with it is put into the flame of a spirit lamp, it burns with a yellow sooty flame. It is soluble in alcohol and æther; water precipitates it from them; it dissolves iodine, phosphorus, and sulphur; is not decomposed by potassium; but when this metal is heated in its vapour, combustion and explosion ensue, chloride of potassium is formed, and charcoal is deposited.

It is composed of

Three equivalents of	chlorine	36 × 3 =	108
Two „	carbon	6 × 2 =	12
One „	hydrogen	=	1
		Equivalent	121

CHLO'ROMYS. [AGOUTI.]

CHLORO-NITROUS GAS, a compound of chlorine and nitric oxide gases discovered by Mr. E. Davy: he obtained it by treating chloride of sodium with nitric acid sufficient to moisten it; the results are that the sodium is oxidized and converted into soda by the oxygen of a decomposed portion of the nitric acid, and thus combining with the undecomposed portion of nitric acid, they form nitrate of soda, while the chlorine unites with the nitric oxide of the decomposed nitric acid, and they form the gas in question.

Chloro-nitrous gas is of a pale reddish colour: its smell resembles but is rather weaker than that of chlorine: it emits fumes when exposed to the air, is absorbed by water, and possesses bleaching power: it is decomposed by most substances which have an affinity for chlorine, as some of the metals, phosphorus, &c. It consists, according to Mr. Davy, of equal volumes of chlorine and nitric oxide gases, combined without condensation.

CHLOROPAL, a silicate of iron. [IRON.]

CHLOROPHÆITE, a mineral found by Dr. MacCulloch in the Isle of Rum, &c. It occurs in small masses imbedded in basalt or a black indurated ironstone. Its colour when fresh broken is green, which becomes black by exposure to the air. It is brittle and soft enough to be scratched by a quill. Its specific gravity is 2·02. Some specimens are transparent, others are opaque. The lustre is vitreous: the fracture of the transparent sort is conchoidal, of the opaque, intermediate as to conchoidal and granular. (Philips's *Mineralogy*.)

CHLOROPHANE. [FLUOR.]

CHLOROPHYLE. The colouring matter of leaves has been thus named by Pelletier and Caventou. It is obtained by bruising, pressing, and then washing them with water, and afterwards treating them with alcohol, which dissolves the green colour and wax: when water is added to this solution, and the alcohol distilled, the green substance, which contains wax, floats on the surface of the water; when this is heated with æther, the wax is dissolved, and chlorophyle remains nearly pure. When exposed to light, or the action of chlorine, it is bleached. Acids produce a similar effect, and by the alkalis it is converted into soap. The red tint which leaves assume in autumn appears to be owing to the formation and action of an acid; the green colour is restored by an alkali.

CHLOROPSIS. [MELLIPHAGIDÆ.]

CHOCOLATE NUT TREE. [CACAO, vol. vi. p. 96.; THEOBROMA.]

CHOCTAWS, one of the aboriginal tribes still inhabiting the southern states of the North American Union: they are now entirely restricted to the state of Mississippi, of which they occupy the middle portion, on both sides of the river Yazoo, a tributary of the Mississippi, and the country about the source of the Pearl River. Formerly they were a powerful tribe, but their number has been reduced by war and by emigration to the countries on the banks of the Arkansas. Still they probably do not fall far short of 10,000 individuals. Like some other of the southern tribes in the United States, they have applied themselves to agriculture, especially to the rearing of cattle and swine. Some

naries have introduced among them the doctrines of Christianity, and have formed a few schools. Their language resembles that of the Cherokees.

CHOCZIM, or Chotim, a small fortified town, in the Russian government of Bessarabia or Kishenew, on the banks of the river Dniester, about 48° 30′ N. lat., and 26° 30′ E. long. Near it there is a small fortress. Its situation opposite the Polish fortress of Kaminiec rendered it a place of note in the wars between the Poles and Turks, and more recently between the Turks and the Russians. In 1739 it was taken by the Russian general Munnich. Population 4000.

CHŒROPOT′AMUS, a fossil genus, instituted by Baron Cuvier on the examination of the jaws, whose general form and dimensions are analogous to those of the hog, and which would seem to belong to an animal nearly approaching the Peccaries, but larger. Teeth, six incisors and two canines in each jaw, and seven molars on each side.

Example.—*Chœropotamus gypsorum.* Found in the Paris gypsum.

CHOIR [CHURCH.]

CHOIR, that part of a cathedral, between the chancel and screen, in which divine service is performed: it is separated from the nave by the screen, over which the organ is, in England and Ireland, commonly placed.

The CHOIR is also the term by which the lay-vicars, or lay-clerks, and choristers, *i.e.* the singers, of a cathedral, are collectively designated. Their number in each cathedral varies, in most cases in proportion to the degree of integrity possessed by the respective dean and chapter at the Reformation, and subsequently. But, generally, the dignitaries contrived to retain as scanty a portion as possible of the musical members of the church, in order to augment their own emoluments; and with the same view deprived, in several instances, that part of the choir which they suffered to remain of no inconsiderable share of the revenues to which it was legally entitled, as in the case of Bangor, in which the court of chancery interposed, and restored to the organist and choir property to a large amount, whereof they had long been most unjustly dispossessed. With some striking exceptions, the choir service is now performed in by no means a reputable manner, owing partly to the paucity of singers, but chiefly to the lowness of their salaries, which, in a majority of cases, are hardly equal to the wages of the humblest mechanic; consequently, the musical duties of our cathedrals too often are allotted to persons either unqualified, or dissatisfied and negligent.

CHOISEUL, ETIENNE FRANÇOIS, DUC DE, born in 1719, rose to the highest offices in the state under Louis XV., and was in fact the ruling minister during a great part of that reign. He was made minister for foreign affairs in 1758, minister at war in 1761, and some years after he resumed the department of foreign affairs. He held this last office till December, 1770, when, in consequence of his imperious character, which had made him many enemies at court among men of all parties, the most influential of whom were the Maréchal de Richelieu, the Duc d'Aiguillon, and the Ex-Jesuit Abbé de la Ville, he was dismissed from office, and exiled to his estate of Chanteloup, where he wrote his memoirs and a satirical comedy against the royal family, and especially against the Dauphin, afterwards Louis XVI., styled 'Le Royaume d'Arlequinerie,' which he printed himself at Chanteloup, and distributed among his friends. His memoirs were published at Paris in 1790, after his death. The administration of the Duc de Choiseul was singularly unfortunate. In the war against England, which terminated by the peace of Paris in 1763, France lost Canada, and her fleets, as well as those of Spain, were defeated: and in the seven years' war France took the part of Austria against Frederic of Prussia, who triumphed over both. The Duc de Choiseul is also accused of not taking advantage of a party in Poland which, after the death of Augustus III., was disposed to offer the crown to the prince of Conti, and the result was that Catharine of Russia placed the crown of Poland on the head of her favorite Poniatowski. The duke of Choiseul's partiality for Maria Theresa of Austria has been also strongly censured. He concluded the marriage between Marie Antoinette and the Dauphin, afterwards Louis XVI. In 1760 he expelled the Jesuits from France. He is also said to have secretly encouraged the first symptoms of discontent among the English colonies of North America.

The personal character of the duke was generous though haughty; he was disinterested and splendid in his expenditure, by which he ruined his own fortune. He loved the arts and literature, and was a friend of Voltaire and the other literary characters of that age. His enemies exaggerated his faults, and attributed to him crimes of which there is not the least evidence. He died at Paris in May, 1785. (*Examen du Ministère du Duc de Choiseul* in the *Mémoires du Duc d'Aiguillon.*)

CHOKE-DAMP. [CARBONIC ACID GAS.]

CHOLÆPUS. Illiger's generic name for the two-toed sloths. [UNAU.]

CHOLERA, from χολὴ and ῥέω, signifying *bile-flux*, a disease which has derived its name from its supposed cause, a preternatural quantity and a morbid quality of the biliary secretion.

The first symptom of this malady commonly consists of griping pains of the bowels; these are soon followed by vomiting and purging: there is always a redundancy and an altered condition of the bile, and, in some cases, after the vomiting and purging have continued for some time, there supervene spasms in different parts of the body, but particularly in the upper and lower extremities, and more especially in the legs. The tongue is usually dry, the thirst urgent, and the urine scanty. The pulse, at first free and frequent, as the disease advances becomes smaller and weaker, and the strength is very rapidly reduced. This form of the disease is commonly termed *bilious cholera.*

The chief exciting causes of this malady appear to be particularly connected with temperature. It rarely if ever attacks in the spring, at least in this country, while it is seldom altogether absent in the latter part of summer, and particularly when summer is passing into autumn. Hence its exciting cause would appear to be not so much a high temperature as an alternation of temperature from heat to cold, such an alternation constantly taking place at this season of the year, and occurring every day, in the great difference that takes place between the temperature of the day and that of the night. Accordingly this disease is observed to be by far the most frequent and the most severe at the seasons when those alternations are the most remarkable; when, for example, cold easterly or northerly winds suddenly set in after hot weather, and, above all, when this cold is combined with a moist atmosphere, as 'during very warm summers and autumns occurring after a very rainy winter and spring, or after a succession of wet seasons, and when the days have been warm, bright, and sunny, and the nights cold with heavy dews.' When such a concurrence of circumstances takes place in a high degree, the disease becomes so prevalent as to be as truly epidemic as any of the forms of fever common to the climate.

It is generally conceived that the use of certain kinds of fruit which abound at this season, as cucumbers and melons, and certain vegetables, as peas and the undressed vegetables used in salads, are powerful concurrent causes. In persons very much predisposed to this malady, such articles of diet may co-operate with the season to produce it; but when the state of the season is such as to render the disease epidemic, it attacks numbers of persons who never use food of this kind. Animal food of a bad quality or too long kept, as animal food of all descriptions is very apt to be at this season of the year, is a much more powerful concurrent cause. So also is excess of food, though of the best quality, and intemperance in the use of malt, vinous, and spirituous liquors, together with whatever causes tend to diminish the vital energies, and so to lessen the power of resistance inherent in the body to the influence of noxious agents.

There is reason to believe that certain poisonous particles of matter, derived from decayed vegetable and animal substances, and diffused in the atmosphere, are among the most powerful exciting causes of cholera, as it is certain that they are of fever. Hence it has been observed that to certain districts in some southerly climates, particularly between the tropics, bilious cholera may be said, from the frequency of its occurrence, to be strictly endemic, although in a less marked degree than certain forms of fever or dysentery. 'According to my own observation,' says Dr. Copland, 'and that of several friends whose range of experience has been great, bilious cholera is very prevalent in situations which are subject to emanations from decayed vegetable matter or putrid matter of any description, particularly from swamps, moist grounds, the banks of rivers,

lakes, or canals, &c., and from foul drains or cess-pools, during warm seasons, or wide and rapid changes of temperature; or when the thermometer rises high during the day, and sinks low towards the night and morning.'

The presence of these miasmata as the cause of cholera accounts for the much greater prevalence and severity of this disease, in this country, in antient than in modern times. The account given by Sydenham, who wrote about the middle of the seventeenth century, of the regular annual return of cholera and of its great fatality, may well make us rejoice at the altered condition as to cleanliness of our streets, drains, and houses, and at the different kind and better quality of our food.

'This disease,' says Sydenham, writing of cholera as it appeared in London in the year 1699, 'comes as certainly at the latter end of summer and at the approach of autumn as swallows at the beginning of spring, and as cuckows at the heat of the following season. That disease which is occasioned by a surfeit comes at any time; the symptoms are indeed alike and the cause the same, yet it is of another kind. The cholera is easily known, for there are violent vomitings and an evacuation of ill humours with great difficulty and trouble by stool: there is a violent pain and inflammation of the belly; a heart-burning, thirst, a quick pulse with great anxiety, and often a small and unequal pulse with great nausea and sometimes a colliquative sweat, contractions of the arms and legs, fainting, a coldness of the extreme parts, and such like symptoms, which frighten the bye-standers and kill the patient in twenty-four hours.'

The persons most liable to bilious cholera are either those whose bowels are preternaturally irritable, and who are consequently subject to diarrhœa, or those whose bowels are torpid, and who are consequently subject to habitual constipation. In the latter case it is probable that the biliary secretion is sometimes long retained in the gall-bladder, where it becomes changed in nature, and acquires irritating properties.

Bilious cholera is rarely fatal in this country, excepting at seasons when the concurrence of circumstances is peculiarly favourable to the production of a severe form of the disease, and when at such seasons it attacks persons very much predisposed to it, and whose constitutions have been previously enfeebled by other causes. Its ordinary duration is from twenty-four hours to three or four days, when it often spontaneously disappears; but in general medical aid is indispensable; and when the attack is severe, if such aid be not promptly afforded, the danger of the disease and the difficulty of the cure are very seriously increased.

The milder forms of bilious cholera may pass away without the occurrence of any degree of spasm; but when the attack is severe, spasm is as constantly present as vomiting or purging. And cases now and then occur in which the spasm comes on so early and is so prominent as to give its own name, *spasmodic cholera*, to the disease. Spasmodic, by no means as frequent as bilious cholera, is on the other hand a much more formidable malady. It is indeed the same in nature, and arises from precisely the same causes, but its intensity and danger are widely different. Its attack is often immediately preceded by a sense of chilliness or a distinct rigor; the griping pains are more severe than in bilious cholera; the vomiting and purging are more urgent; the matter rejected consists of a watery or slimy fluid, and very soon there come on painful and violent spasms, which attack the muscles of the abdomen, thighs, legs, thorax, and lastly the arms and hands. These symptoms are attended with a small, quick, and contracted pulse, great thirst, and the immediate rejection of whatever is taken into the stomach. 'As the disease proceeds,' says Dr. Copland, who witnessed its progress in an intertropical climate, and who experienced it in his own person, 'the pulse becomes weaker and smaller; the spasms more general; the purging constant and painful, generally with tenesmus; the vomitings are renewed upon the ingestion of substances into the stomach; and the powers of life rapidly fail. During this time the fluids evacuated from the stomach and bowels present no appearance of bile, although occasionally bile is seen in the evacuations to a small extent. In the course of a few hours the features shrink, the hands and feet become cold and clammy; the exacerbation of the spasms forces out a cold clammy sweat on the face and breast; the pulse is extremely small and weak, or nearly disappears. In a case which came before me in Africa, in 1816, the pulse could scarcely be felt four hours from the attack; and the contents of the stomach are now, in the more dangerous cases, thrown off without any effort of retching. Commonly during all this time the fæcal matters and the biliary secretions are retained, apparently owing to the extension of the spasms from the duodenum to the common biliary duct, and to spastic constrictions of parts of the colon; the epigastrum and hypochondria being sore, tense, and tumid. When the disease is treated with decision, the vomitings cease; free evacuations with a discharge of bile take place, and the patient soon recovers. But if neglected, or improperly managed, the powers of life fail rapidly; the eyes sink, and are surrounded with a livid circle; the countenance assumes a remarkably anxious cast, or is pale, wan, and shrunk; and the spasms extend to the very fingers. The breathing now becomes extremely laborious; the patient is restless, and at last is carried off, sometimes in the space of ten or twelve hours.'

The pathological state constituting the disease seems to consist of irritation of the mucous surface of the digestive tube, commencing in the duodenum and extending in each direction to the stomach, small intestines, and along the common duct to the gall-bladder and liver, with increased action of the muscular coats of these viscera and determination of the circulating fluid to them. This irritation or morbid excitement, owing to the connexion of the organic nerves supplying those parts, is propagated to the spinal nerves, by which the muscles of the abdomen and extremities are affected by painful and violent contractions; and it is chiefly owing to the exhaustion of the vital manifestations of the organic system of nerves, and to the frequent and profuse discharges, that a fatal issue takes place: the circulating organs, which are actuated by this system, being in consequence incapable any longer of performing their functions.

In regard to the treatment, Sydenham recommends in the early part of the attack the promotion of the discharge of the offending matter by means of diluents, such as weak broths and soups; and since his time this practice has been very generally followed. 'When the discharge has continued some time opium is indispensable, which is best given in the form of pill, in doses of from one to three grains, repeated at short intervals. The muriate of morphia, in doses of from half a grain to two grains, is also an excellent remedy. In some cases the opium should be combined with calomel: and in the intense forms of this disease, common in warm climates, twenty grains of calomel combined with opium, repeated once or twice after an interval of from three to six hours, is found by experience to be the most effectual remedy. Under such circumstances these large and repeated doses of calomel do not salivate, partly because the whole of the calomel is never retained, and partly because the system is not in a condition favourable for the absorption of what does remain in the stomach.

The malady, new to this climate, which has spread to so many different nations of the globe, and which has swept away so many of its inhabitants, commonly known under the name of *pestilential cholera*, is a totally different disease from that here treated of, and is noticed under the article PESTILENCE.

For a more minute account of the symptoms, and for the details of the treatment of bilious and spasmodic cholera, see Sydenham's works; Dr. James Johnson *On Diseases of Intertropical Climates;* Dr. Chisholm *On Diseases of Tropical Climates;* and Dr. Copland's *Dict. of Practical Med.*

CHOLESTRINE, the crystalline matter which constitutes the basis of most of the biliary concretions of man. It is inodorous, insipid, insoluble in water, but soluble in hot alcohol, from which it separates on cooling. When treated with nitric acid it acquires the properties of an acid and is called cholestric acid. [CALCULUS.]

CHO'LIAMBIC, the name of a kind of verse employed by Greek and occasionally by Latin writers (*e. g.* Martial). It consisted of six feet, and was regulated by the same general laws as the iambic verse of tragedy. In two or three points it differed considerably: the fifth foot was properly and generally an iambus, though a few instances are found of a spondee in its place: the sixth foot was always a spondee or trochee. From this circumstance the name Choliambus (χωλίαμβος) is derived, which means lame iambus; the metre limps, as it were, in the sixth foot. Anapæsts appear in the first foot, but in no other. Hipponax was one of the earliest writers in choliambic verse, and has therefore been called the inventor of it. The fragments of his poetry have been collected by Prof. Welcker.

Simonides and Callimachus also wrote in this metre, and a few specimens from the latter poet remain. The age succeeding the death of Alexander contained many choliambic writers, who employed the same antiquated dialect that they found in the compositions of Hipponax and others. The fable-writer Babrius [BABRIUS], who lived a little before the Augustan age, revived the choliambic poetry, and, influenced probably by preceding poets, who had adopted the same metre, he appears not to have considered himself bound by the custom of his own age in the choice of words. (*Philological Museum*, vol. i., pp. 280-304.)

CHOLLET, or CHOLET, a town in France, in the department of Maine et Loire, and on the little river Moine, which flows into the Sèvre Nantaise, about 190 miles S.W. of Paris in a straight line, or 217 miles by Chartres, Tours, and Saumur, in 47° 3′ N. lat., and 0° 53′ W. long.

The town is situated in a pleasant and fertile country, not far from the left bank of the Loire. Before the revolution it had two religious houses, an antient castle in good preservation, and an hospital: the castle and hospital were destroyed in the Vendean war, and the ci-devant convent of the Cordeliers was in consequence converted into an hospital. The population in 1832 amounted to 4657 for the town, or 7315 for the whole commune. The inhabitants manufacture linen-cloth, calico, and handkerchiefs, which resemble those of India, and carry on a considerable trade in cattle.

CHOLULA, a town in Mexico, in the state of Puebla, lying in 19° 2′ 6″ N. lat., and 98° 15′ W. long. It is situated on the table-land of Anahuac, at an elevation of 6912 feet above the level of the sea, according to Humboldt. Cholula is a considerable place, being inhabited by 16,000 souls, but its manufacturing industry is limited to the fabrication of coarse cotton goods. In the country about it are numerous and extensive plantations of maguay, from which plant the natives extract the beverage called *pulque*. Close to the town stands the largest of the Mexican *teocalli*, or pyramids. It is built like the pyramid at Sakhara, in Egypt, in terraces, of which there are four. Its height is 177 feet, and the length of each side of its base is 1440 feet. Its four sides lie exactly in the direction of the parallel and meridian lines. The platform on its top has an area of somewhat more than 50,000 square feet, and in the midst of it is built a church, dedicated to the Lady de los Remedios, in which mass is read every morning by a priest of the Indian race. The prospect from this platform over the adjacent plain, as far as the great mountain-masses of Popocatepetl and Pico de Orizaba, is very grand and striking. This interesting monument of the antient inhabitants of Mexico consists of alternating strata of bricks and clay cement. At no great distance from it are two other teocalli, but of smaller dimensions.

CHONAD, CHANAD, CSANAD or TSCHANAD, a county in the southern part of Hungary, in the province 'Beyond the Theiss.' It is bounded on the north by the county of Bekes, on the south by the territory of Temeswar, on the east by the counties of Sarand and Arad, and on the west by the county of Tschongrad; it lies between 46° and 47 N. lat. and 20° and 22° E. long. Like the surrounding counties, Chonad is a level plain, broken here and there by inconsiderable eminences. The Maros flows along its southern frontier from Sajten to Klarafalva, and, like the Theiss, forms numerous swamps, which are called *Pannahát* and *Gentschát*. It is also watered by the Szaraz, a branch of the Maros. Chonad contains 623 square miles, yet does not include more than 2 market towns, 11 villages, and 30 prædia, or privileged settlements. Its population, in 1787, was 35,868; in 1794, 35,992; and, in 1808, 35,447; but it has advanced rapidly of late years, and may at present be estimated at 47,500. The soil is very favourable to the cultivation of every species of grain, especially wheat, which is excellent and very abundant. The culture of the vine is carried on in several places; the best wine is that made at Mako: the tobacco is also in high estimation; and, on the whole, an increased attention has of late years been paid to horticulture. Chonad contains 40,853 yochs, or 58,361 acres, of meadow and pasture land; 88,666 yochs, or 126,657 acres, of arable land; 13,977 yochs, or 19,967 acres, of vineyards, and 5712 yochs, or 8160 acres, of garden ground. The woods and forests occupy 79,526 yochs, or 113,608 acres. A fine breed of horned cattle is reared in this and the neighbouring counties: that of Mako is famed throughout Hungary. Numerous herds of swine are fattened in the oak and beech forests, and much care is bestowed on the improvement of the flocks. In no other part of Hungary is the breeding of horses carried on with more skill and success than in this county, especially in the celebrated 'Mezohegyes,' an institution founded by Joseph II. in 1785, which stands unrivalled in Hungary, and probably in Europe. These royal mews are handsome and extensive, and always contain 3500 of the finest horses, the rearing and training of which employ 500 men and soldiers. From the proximity of the Maros and Theiss, Chonad is supplied with an abundance of fish; honey also is plentiful. No minerals are found here, and the spring-water is very unwholesome.

The county of Chonad is inhabited by Hungarians, Raitzes, Walachians, Sclavonians, and Jews. The Hungarians occupy six villages; the Walachians four, and the Sclavonians one. Of these 1209 are Roman Catholics, 10,293 Greeks, 4245 members of the Evangelical communion of the seigniory of Bekes (for the most part Sclavonians), 6600 of the Reformed church, and 800 Jews. There are very few mechanics, as nearly the whole population is employed in agriculture. The yearly quota of Chonad for the national war expenses is 17,220 florins, about 1730*l.* The whole county consists of only one circle.

CHONAD, or CSANAD, the capital, on the river Maros, contains 6737 inhabitants, and was formerly a place of some importance. Its castle has long since fallen into decay. It was erected into a bishopric by King Stephen I. in the year 1036, but the bishop does not reside here. It has two churches, and is the residence of a Greek protopape. 46° 10′ N. lat. and 20° 35′ E. long. The town of Mako, on the Maros, situated to the east of Szegedin, contains 15,160 inhabitants, and the general meetings of the states of the county are held here.

CHONAD, a village in the county of Torontal, in Hungary. It lies on the river Maros, and contains 5900 inhabitants, a castle, and one Catholic and one Greek church; it was formerly the seat of the bishop of Chonad, who was subject to the archbishop of Colocza. After the conquest of the fortress of Temeswar, in 1716, it was reunited to the Banat of Temeswar, after having continued for 165 years under Turkish dominion.

CHONDROPTERYGII, or CARTILAGINEI, one of the two great sections into which the class *Pisces* is divided. In this section we find species which possess, in most respects, the highest degree of organization, while others possess the lowest observed in the class.

The principal character which distinguishes this section from the fishes with true bone (which usually come first in arrangements) is the cartilaginous substance of which the bones are composed, a circumstance arising from the very small quantity of earthy matter which enters into their composition. This earthy matter, when observed, is found to be disposed in small granules, and not in distinct fibres, as in the first section.

The cranium of these fishes is not divided by true sutures but is formed of a single piece: the maxillary and intermaxillary bones are either wanting or rudimentary, and their functions are performed by bones analogous to the palatines, and sometimes the vomer. Many of the vertebræ are often consolidated. The gelatinous substance, which in most fishes fills the intervals between the vertebræ (these intervertebral masses being connected only by a small cord), in this section frequently forms a thick cord, which varies but slightly in diameter.

In the Myxine (*Gastrobranchus cæcus*), no distinct vertebræ are perceivable, their place being occupied by a soft gelatinous tube. In the extraordinary little fish described by Mr. Yarrell in his 'History of British Fishes,' the lancelet (*Amphioxus lanceolatus*), this part is still more rudimentary, consisting only of a slender transparent column.

The Chondropterygii are divided by Cuvier into two orders—those which have their gills free, as in the generality of fishes; and those in which they are fixed,—that is, the external edge attached to the skin. In the former of these orders, the species have but one external gill-opening, and in the latter they have several—generally five. These orders are divided into families and genera, as follows:—

Order 1. Chondropterygii with free gills.

Family 1. Sturionidæ (or *sturgeons*.)
Genus 1. Accipenser.
—— 2. Spatularia.

Family 2. Chimæridæ *,
Genus 1. Chimæra.
Order 2. Chondropterygii with fixed gills.
Family 1. Squalidæ (*sharks*, &c.)
(The principal genera are)
Squalus,
Zygæna (*hammer-headed sharks*),
Squatina (*angel-fish*),
Pristes (*saw-fish*),
Family 2. Raiidæ.
(principal genera:)
Torpedo (*electric rays*),
Raia (*skate-fish*),
Trigon (*sting rays*),
Myliobates (*eagle ray*),
Cephaloptera.
Family 3. Pteromyzidæ (lampreys, &c.)
Genus 1. Pteromyzon,
2. Ammocœtes,
3. Gastrobranchus,
4. Amphioxus.

CHONDROSE'PIA, Leukard's name for a genus of cephalopoda. [TEUTHIDÆ.]

CHONDRUS (Zoology), a pulmoniferous mollusk. [PULMOBRANCHIATA.]

CHORA'GUS, the name of a public officer at Athens. Each phyle, or tribe, had a choragus (χορηγὸς), who was obliged to provide a chorus to perform at the representations in the theatre, and at many religious solemnities. The office was probably rotatory, though none but rich persons able to bear the expenditure without inconvenience could be forced to take it. (Fred. Aug. Wolf, *Prolegomena in Demosth. Orat. Leptin.* p. lxxxvii.) The choragus had entire charge of the whole choral apparatus: he paid for the dresses and the crowns, and all other decorations. He also provided and paid a teacher (χοροδιδάσκαλος, chorus-teacher), who instructed and trained the choristers in the arts and graces of their profession. Every expense of whatever kind attendant on the equipment of a chorus, either in the theatre or in any other exhibition, was discharged by the choragus. The tribes vied with one another in the splendour of their exhibitions, and especially in the sumptuousness of the choral ornaments: sometimes the expenses incurred by the state were so heavy, that both the treasury and the resources of individuals were exhausted. (See also *Xen. Hipparch.* i. 26.) In some cases the choragus seems to have led the chorus in person, as well as to have defrayed the expenses; and once a choragus acted as flute-player at Sparta. (Müller's *Dorians*, vol. ii., p. 341.) The term choragus included sometimes the gymnasiarch and the hestiator. (Fred. Aug. Wolf, *in Demosth. Leptin. Orat. Comment.* 16, 24.) The former of these had charge of the athletic exercises of the youth; and the latter was obliged to give a banquet to his tribe on occasion of any great holiday or festival: these offices were similar in kind to that of the choragus, which, probably from being the most expensive and important of the three, stands frequently for the whole. The choragus is not to be confounded with the choropoios (χοροποιὸς), who was general chorus-manager to all the tribes. (Xenoph. *Ages*, ii. 17; Müller's *Dorians*, vol. ii., p. 341, *note*.) Some age appears to have been fixed below which it was not competent to a man to be made choragus: a choragus of boys could not be under forty years of age; the age required in other cases is not known. A resident alien or metic (μέτοικος) could not hold the office. Demosthenes was on one occasion a volunteer choragus, and was grievously insulted during his term of office by Meidias. (Demosth. *against Meidias*.) A tripod was the common prize of the successful choragus, who occasionally erected a small building on which he placed the prize. Such is the choragic monument of Lysicrates at Athens, commonly called the Lantern of Demosthenes. (*Elgin Marbles*, ii. 76, 89, &c.)

* We adopt the names of the families as given by Mr. Yarrell. It is proper here to state that the position of the genus Chimæra is doubtful, possessing, as it does, some of the characters of both orders. As regards the gills, we will quote Dr. Richardson's account:—'The Chimæræ,' says this gentleman, 'though placed by Cuvier at the end of the sturionidæ, seem to belong more properly to his second order of the Chondropterygii, in which the gills are fixed; for though there is only one apparent gill-opening on each side, the gills in reality adhere by a large part of their borders, and there are consequently five holes communicating with the external gill-opening.' Cuvier however was not ignorant of these facts when he placed the genus Chimæra in the first of the two orders.

CHORD (in mathematics), a straight line drawn from one point to another of a curve. [ARC.] The term chord was also used in trigonometry, with sine, cosine, &c., to denote the chord of a circle, in which case it was also called the chord of the subtending angle. But this term, not being wanted, has not passed into pure algebra with sine, cosine, &c. [CIRCLE], so that when used, it must be considered as retaining its primitive sense, namely, that of a straight line, not an abstract number expressing the ratio of a straight line to the radius. To find the chord of a given angle, multiply the diameter by the sine of half the angle. Thus the angle being 23° 20′, and its half 11° 40′, take the sine of the half, which is ·2022176. If the diameter be 100 feet, then the chord of 23° 20′ is 20·22176, or 20¼ feet nearly.

To find the chord of a given arc, find the angle subtending the given arc [ANGLE], and proceed as before. The following Table of Chords, to every degree up to 180°, will frequently be useful in rough calculations. The diameter is throughout 10,000, to avoid decimals.

TABLE OF CHORDS (DIAMETER 10,000.)

Angle	Chord.	Angle.	Chord.	Angle	Chord	Angle.	Chord.
1	87	46	3907	91	7133	136	9272
2	175	47	3987	92	7193	137	9304
3	262	48	4067	93	7254	138	9336
4	349	49	4147	94	7314	139	9367
5	436	50	4226	95	7373	140	9397
6	523	51	4305	96	7431	141	9426
7	610	52	4384	97	7490	142	9455
8	698	53	4462	98	7547	143	9483
9	785	54	4540	99	7604	144	9511
10	872	55	4617	100	7660	145	9537
11	958	56	4695	101	7716	146	9563
12	1045	57	4772	102	7771	147	9588
13	1132	58	4848	103	7826	148	9613
14	1219	59	4924	104	7880	149	9636
15	1305	60	5000	105	7934	150	9659
16	1392	61	5075	106	7986	151	9681
17	1478	62	5150	107	8039	152	9703
18	1564	63	5225	108	8090	153	9724
19	1650	64	5299	109	8141	154	9744
20	1736	65	5373	110	8192	155	9763
21	1822	66	5446	111	8241	156	9781
22	1908	67	5519	112	8290	157	9799
23	1994	68	5592	113	8339	158	9816
24	2079	69	5664	114	8387	159	9833
25	2164	70	5736	115	8434	160	9848
26	2250	71	5807	116	8480	161	9863
27	2334	72	5878	117	8526	162	9877
28	2419	73	5948	118	8572	163	9890
29	2504	74	6018	119	8616	164	9903
30	2588	75	6088	120	8660	165	9914
31	2672	76	6157	121	8704	166	9925
32	2756	77	6225	122	8746	167	9936
33	2840	78	6293	123	8788	168	9945
34	2924	79	6361	124	8829	169	9954
35	3007	80	6428	125	8870	170	9962
36	3090	81	6494	126	8910	171	9969
37	3173	82	6561	127	8949	172	9976
38	3256	83	6626	128	8988	173	9981
39	3338	84	6691	129	9026	174	9986
40	3420	85	6756	130	9063	175	9990
41	3502	86	6820	131	9100	176	9994
42	3584	87	6884	132	9135	177	9997
43	3665	88	6947	133	9171	178	9998
44	3746	89	7009	134	9205	179	9999
45	3287	90	7071	135	9239	180	10000

To use this Table, roughly, take out the chord of the nearest degree, multiply by the diameter, and divide by 10,000. Thus for a diameter of 2 feet, and an angle of 10° (supposing decimals are to be avoided), take out 872 opposite to 10°, and multiply by 2, giving 1744, which in inches is 20,928, which divided by 10,000, gives 2 inches, and $\frac{1}{10}$th of an inch, very nearly.

An easy method of verifying the preceding Table (if a doubt arise in any case) is contained in the following rela-

tions, which apply according as x is greater or less than 120°.

$$\text{ch. of } (x - 120^\circ) + \text{ch. } (240^\circ - x) = \text{ch. } x.$$
$$\text{ch. of } (120^\circ + x) \quad \text{ch. } (120^\circ - x) = \text{ch. } x.$$
$$\text{ch. of } (180^\circ + x) = \text{ch. of } (180^\circ - x)$$

For instance, the chord of 130° is made up of those of 10° and 110°; the chord of 50° is the difference between those of 170° and 70°. These will be true within a unit, if the Table be correct.

CHORD (musical string). [Cord.]

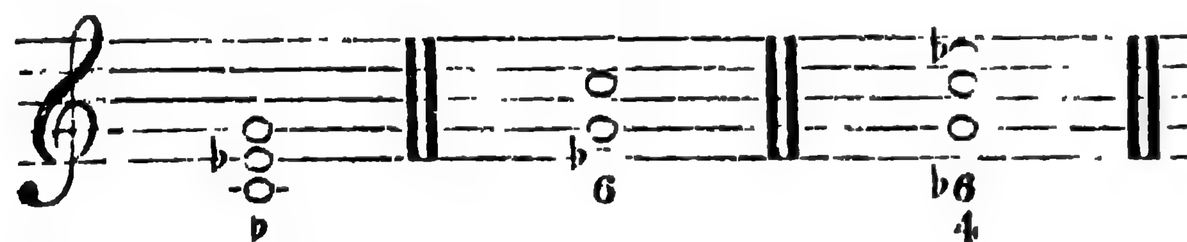
CHORD, in music, is the harmonious combination of three or more musical sounds.

To account for the origin of chords many theories have been proposed, the principal whereof are, that of Rameau,—which D'Alembert endeavoured to elucidate, and Marpurg partly built his system on—and those of Tartini and Kirnberger. These theories, in the main, all arise out of, or finally resolve into, the natural harmonics of a distended string. But it will be proper here to state that Sir John Herschel, in his admirable treatise on Sound, declares 'the insufficiency of any attempt to establish the whole theory of harmony and music on the aliquot subdivision of a musical string.' Nevertheless, the facts that result from the simple division of a stretched string agreeing with the natural harmonic divisions of a sonorous tube—the French horn for instance—and which cannot be disputed, are sufficient to prove that the foundation of what is properly called harmony was not arbitrarily laid. These facts may thus be briefly stated: - the whole string gives, of course, the gravest, or generating, sound; four-fifths of the string give the major 3rd; two-thirds give the perfect 5th; and one-half gives the octave. Thus is produced the perfect or common chord, or triad, which, together with the chord of the seventh, is the source of all other real chords.

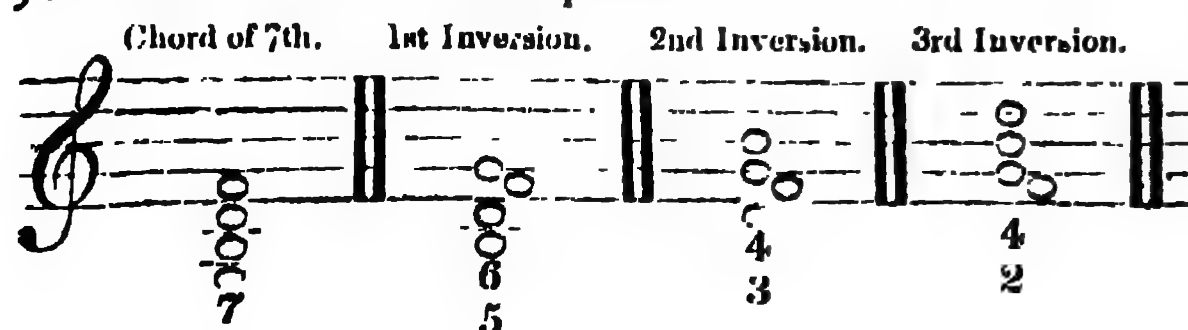
The Perfect Chord consists of any given note, together with a major 3rd and perfect 5th, which sounds may be represented by the letters C, E, G, or by the syllables *do, mi, sol.* It has two inversions, or derivatives: the first is made by taking the E (*mi*) as the base, producing the chord of the *sixth;* the second by taking the G (*sol*) as the base, producing the chord of the *sixth* and *fourth.* Example:—



This chord is denominated the Perfect Minor Chord when its 3rd is flattened; and so altered, its inversions are affected accordingly. Example:—

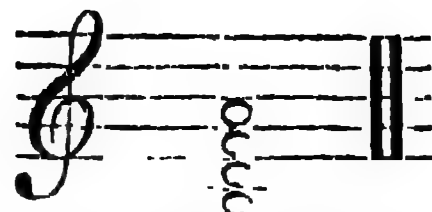


The chord of the seventh—called the dominant seventh—is formed by adding to the perfect chord a minor 7th, and consists of a given note, together with a major 3rd, a perfect 5th and a minor 7th. It may be represented by the letters G, B, D, F, or by the syllables *sol, si, re, fa.* This has three inversions: the first is made by taking the B (*si*) as the base, producing the chord of the *sixth* and *fifth;* the second by taking the D (*re*) as the base, producing the chord of the *fourth* and *third;* the third by taking F (*fa*) as the base, producing the chord of the *fourth* and *second.* Example:—

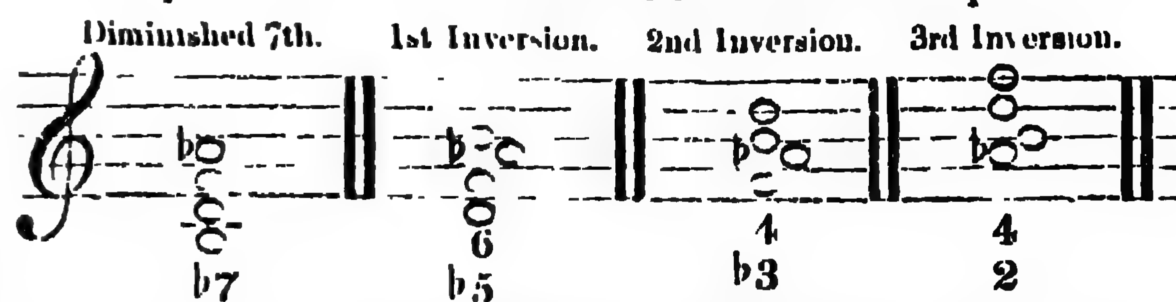


The Perfect Chord and its inversions are called consonant chords: all other chords, and their inversions, are called dissonant chords.

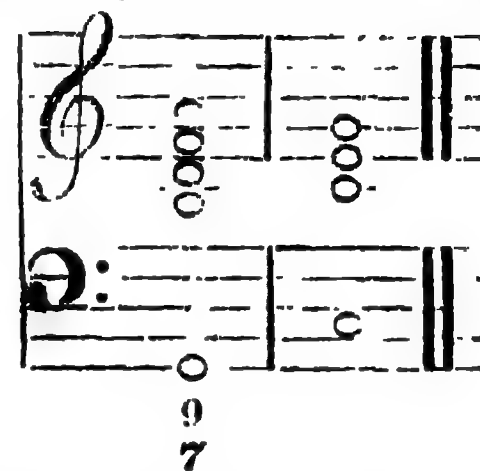
The chord of the Imperfect, or Minor, Seventh, consists of a given note, a minor 3rd, an imperfect 5th, and a 7th. Example:—



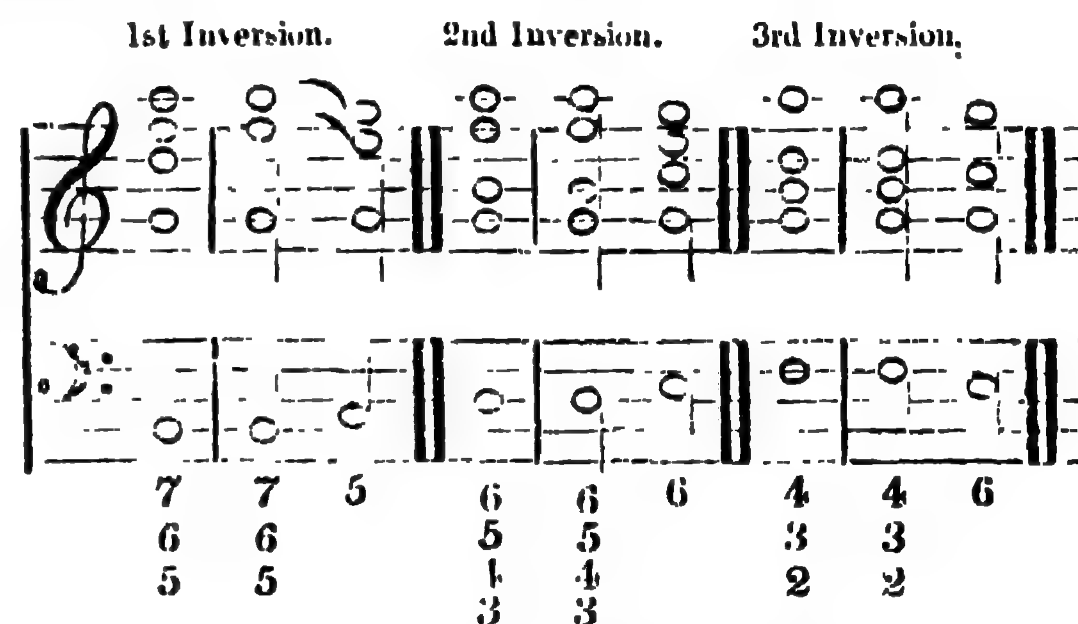
The chord of the Diminished Seventh—sometimes called the Equivocal Chord—consists of a given note, its minor 3rd, imperfect 5th, and diminished 7th. Example:—



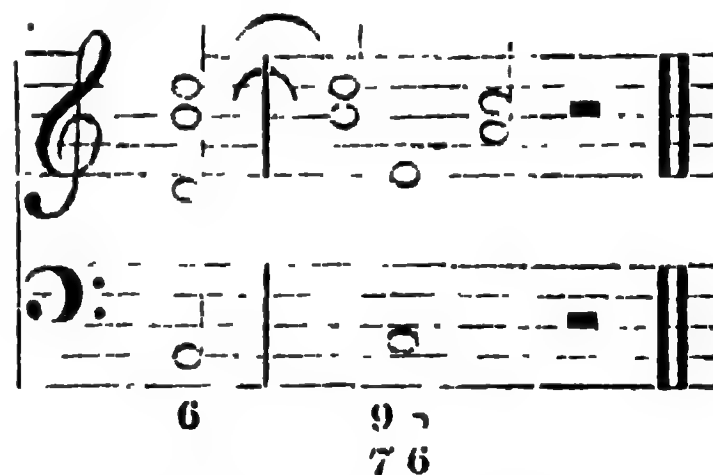
The chord of the Dominant Ninth consists of a given note, its major 3rd, 5th, 7th and 9th. Example:—



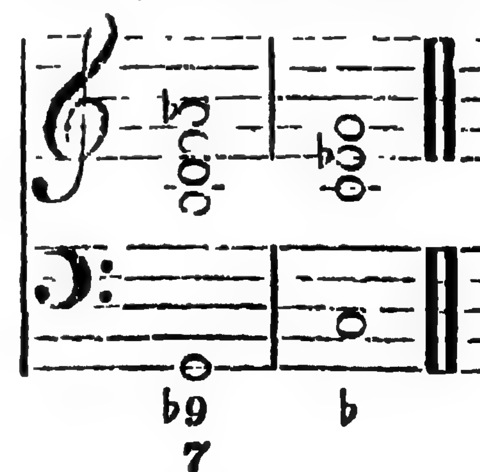
This chord has three inversions, though they are not in very common use. M. Catel gives them in the following manner:—



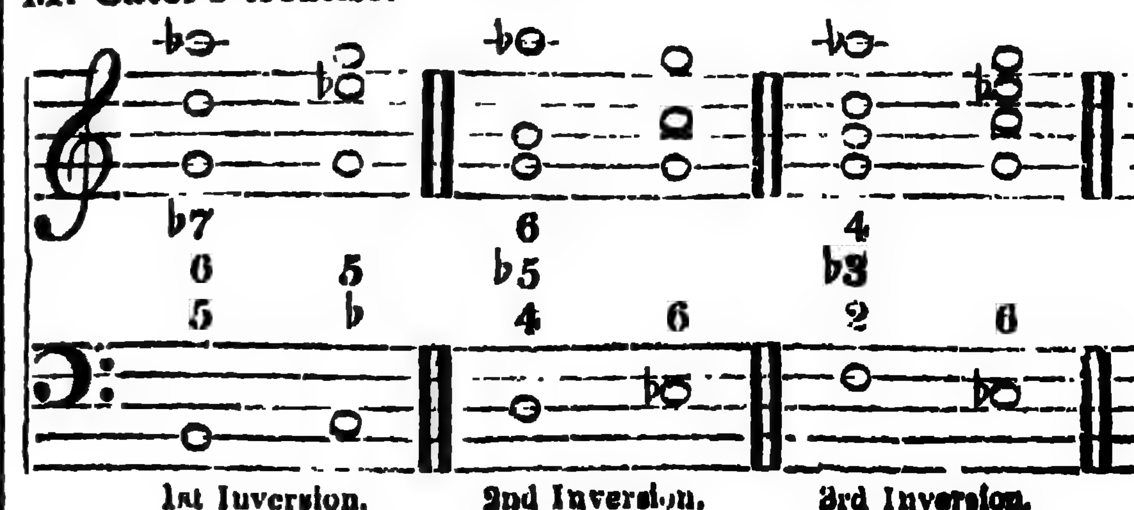
But by far the most elegant form which the chord of the Ninth and Seventh assumes, is as a retardation of the 8th and 6th. Example:—



The Dominant Minor Ninth consists of the same sounds as the Dominant Ninth, but the 9th is flat. Example:—

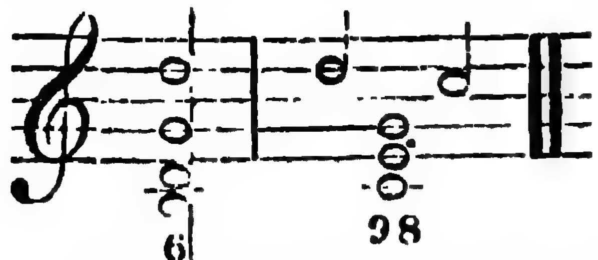


This has three inversions, which also we extract from M. Catel's treatise.

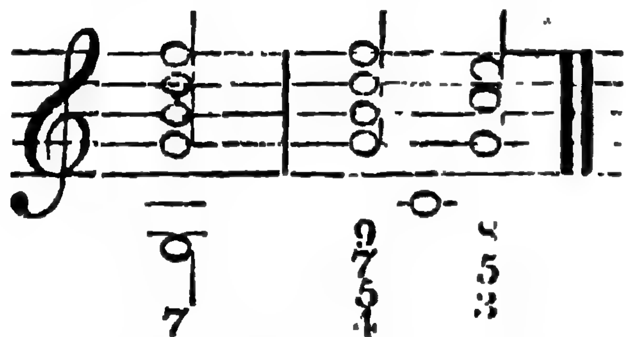


We have seen, that by adding to the perfect chord a 3rd above its 5th, the chord of the Seventh is formed: by the further addition of thirds, theorists form other chords, sometimes called *chords by supposition*. These are, the chord of the Ninth, of the Eleventh, and of the Thirteenth. The last three chords, as well as others presently to be mentioned, are mere chords of retardation: or, in other words, the dissonant notes in them are but appoggiaturas.

The chord of the Ninth consists of a given note, its 3rd, 5th and 9th, the discord retarding the 8th. Example:—

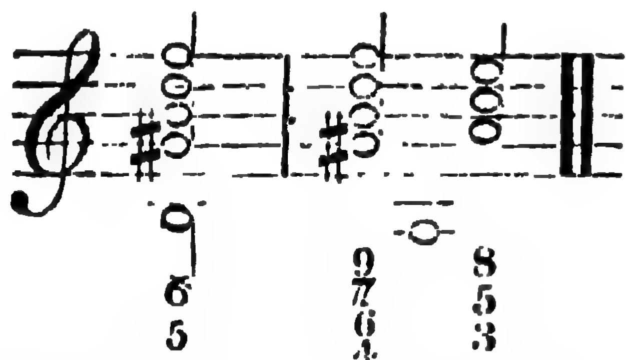


The chord of the Eleventh (more commonly called the chord of the Sharp Seventh), consists of a given note, its 4th (or 11th), 5th, major 7th, and 9th. It is a retardation of the perfect chord, the 9th and 7th retarding the 8th, and the 4th retarding the 3rd, of the perfect chord. Example:—

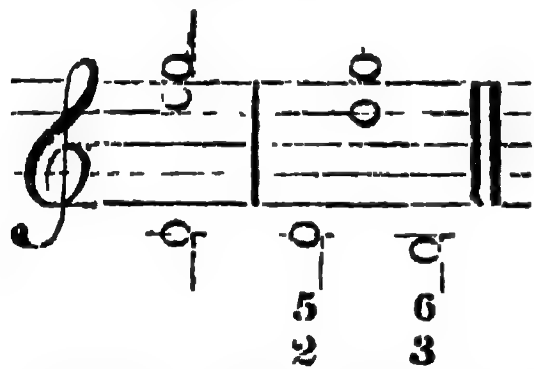


This chord is almost invariably figured by a 7, accompanied by a 5th, 4th and 2nd; but as the discord of the 2nd is always resolved in the base, it cannot, under such name, form a part of the chord of the eleventh.

The chord of the Thirteenth consists of a given note, its 4th, 6th (or 13th), major 7th and 9th. This is a retardation of the perfect minor chord, the 4th and 6th retarding the 3rd and 5th, the 7th and 9th retarding the 8th. Example:—



The chord of the Fifth and Second consists of a given note, its 2nd and 5th. Example:—

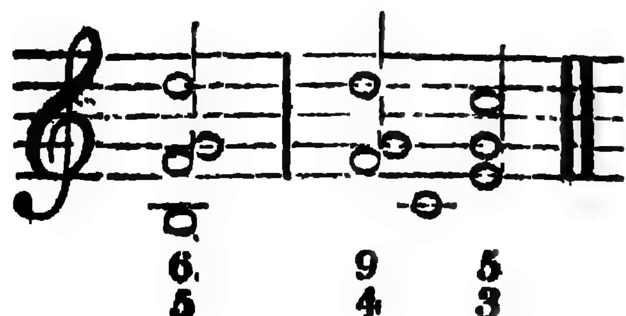


Albrechtsberger considers this chord as one form of the chord of the Eleventh, but the discord being resolved in the base proves it to be a 2nd, not a 9th. It is, in fact, the Sixth retarded by the base.

The chord of the Fifth and Fourth consists of a given note, its 4th and 5th, and retards the perfect chord, the 4th retarding the 3rd. Example:—



The chord of the Ninth and Fourth consists of a given note, its 4th, 5th and 9th. This also retards the perfect chord, the 4th and 9th retarding the 3rd and 8th. Example:—



We will only add that, the nomenclature of chords stands much in need of correction, but, unhappily, it is not the only branch of the theory of music that is confused and perplexing from want of logical accuracy and lucid arrangement.

CHOREA (remotely from the Greek χορεία, and immediately from the Latin *chorea*, a dance with singing—Chorea Sancti Viti—Saint Vitus's Dance), a disease affecting with irregular movements the muscles of voluntary motion, these muscles being no longer under the command of the will, and the power both of walking and of using the arms and hands being impaired. The chief external manifestations of this disease are in the muscles of voluntary motion; but its real seat is in certain internal organs, and more especially in those which belong to the apparatus of digestion. If the history of any case of chorea be carefully examined from the commencement, it will be found that the more manifest disorder has been preceded by deranged appetite, which is sometimes voracious, and at other times altogether lost; by constipated bowels, and by imperfect digestion. There is at the same time a remarkable failure of the general physical strength. The derangement in these organic functions is always accompanied with a greater or less degree of mental disorder. The mind is irritable and fretful, and oftentimes reserved, gloomy, and desirous of solitude. After this state of physical and mental disorder has continued some time, and the languor, lassitude, and general weakness of the system have proportionally increased, there come on irregular and involuntary twitchings of the muscles, particularly the muscles of the face, which at first are thought by the friends of the patient to be merely the effect of imitation. But these convulsive motions progressively increase, until the muscles of the extremities, face, lower jaw, head, and trunk all become agitated with violent and irregular movements. In this case the patient is incapable of walking steadily, his gait is jumping or starting: sometimes he is altogether unable to walk, and seems palsied, while he is equally unable to perform the ordinary motions with the affected arm.

A century and a half ago Sydenham gave the following graphic and correct description of the convulsive motions characteristic of this disease when fully formed. 'First it shows itself by a lameness or rather instability of one of the legs, which the patient drags after him like a fool. Afterwards it appears in the hand of the same side, which he that is affected with the disease can by no means keep in the same posture for one moment: if it be brought to the breast or any other part, it will be distorted to another position or place by a convulsion, let the patient do what he can. If a cup of drink be put into his hand he represents a thousand gestures, like jugglers, before he brings it to his mouth; for whereas he cannot carry it to his mouth in a right line, his hand being drawn hither and thither by the convulsion: he turns it often about for some time, till at length, happily reaching his lips, he flings it suddenly into his mouth, and drinks it greedily, as if designing only to make sport.'

As the disease advances the power of distinct articulation is lost: even the deglutition becomes difficult, in some cases, to such a degree that fluids are forcibly thrown up from the pharynx in attempts at swallowing them: the eyes lose their lustre; the complexion becomes pallid and muddy; the expression of the countenance languid and vacant; and in the severest cases the mouth is variously twisted and the saliva drivels from it; the tongue is protruded irregularly and spasmodically; the eyes are distorted and rolled in various directions, and the sight is occasionally defective. The muscles meantime become soft and flaccid; emaciation takes place; the pulse is weak, but not much quickened; the urine is pale and copious, and the bowels are always constipated.

The mind, irritable from the commencement, is now harassed by painful images and incongruous ideas, which every effort is made to conceal, and various desires and emotions are produced, sometimes without apparent cause. This disordered condition of the mind, when the disease is severe and long continued, ultimately terminates in a state of fatuity, of which the pallid, listless, and vacant countenance is the external sign and expression.

This disease is common to both sexes, but it is much more frequent in the female than in the male, in the proportion of about three of the former to one of the latter. It seldom attacks before the 8th nor after the 15th or 16th

year of age, although no period of life is wholly exempt from it. The different muscles that are affected, and the different degrees in which they are agitated by the irregular motions, give an endless diversity to the external appearance of different cases; for the convulsive motions are sometimes slight, at other times severe, sometimes partial, at other times general; but most commonly they are partial, and sometimes they are strictly confined to one side. The duration of the disease may vary from a few weeks to many months.

Chorea is often associated with other affections more or less closely allied to it in nature, and alternates with them. In the female it is often observed in connexion with chlorosis, with the suppression of the catamenial discharge, and with hysteria, and in the male with rheumatism, paralysis, and dropsy. Occasionally it terminates in epilepsy, paralysis, dropsy, particularly hydrocephalus, and, as has been stated, complete idiotcy. Cases are on record in which it has terminated in violent convulsions, and inflammation of the brain, followed by coma and death

Such being the occasional issue, the disease ought in no case to be neglected or trifled with, especially when, as is invariably the case, the postponement of the proper treatment greatly increases the difficulty of the cure. In general, under proper management, the disease is removed without difficulty, and the return to health is commonly complete, although this is one of the affections which is peculiarly subject to relapse. It is not at all uncommon for the patient, when apparently cured, to be attacked several times in succession either with the same disease or with some one of the affections into which it has been stated to have so great a tendency to lapse. Still however those relapses are curable by persevering in the proper treatment, and it is remarkable that even when paralysis and idiotcy appear to be fully established they yield far more readily to appropriate remedies than when those affections have been induced by a primary affection of the brain.

Chorea arises in widely different states of the system, and is produced by different causes, and therefore in different cases requires a different treatment. But in the great majority of cases it arises from an accumulation of irritating matter in the alimentary canal, which must be removed by a course of purgative medicines. The choice of the purgative and the duration of the course must depend on the state of the system in each particular case; but in general the purgative must be of an active nature, and the course decided and long continued. At the same time the strict regulation of the diet, both as to the quality and the quantity of the food, is indispensable. As this malady almost invariably occurs in an enfeebled state of the constitution, active exercise in fresh and pure air, and whatever medicines of a tonic nature are best suited to the particular circumstances of the individual case, should be combined with the purgative course of treatment.

When this affection is connected, as it occasionally is, with organic disease of the spinal cord or brain, it is of the last importance to the proper treatment of the case that this organic lesion should be discriminated, and that the remedies proper to it should be promptly applied. From what has been stated it will appear that this is one of the diseases which should engage the anxious attention of parents, teachers, and all who have the charge of young persons of either sex. Not only the health or disease of puberty and adolescence, but the health or disease, physical and mental, of mature age, may depend on their prompt attention to, or neglect of, the very first symptoms of this malady.

CHORLEY, a market-town and parish in the hundred and deanery of Leyland, in the county of Lancaster, 208 miles N.W. by N. from London, 22 N.W. from Manchester, 11 miles S.W. from Blackburn, 9 miles S.S.E. from Preston, 11 miles N.N.W. from Bolton, and 8 miles N. from Wigan. It has no dependent township, and is the only market-town in the hundred of Leyland. The parish of Chorley comprizes an area of 2000 statute acres. The town is situated on a hill in the centre of the county, on the great west road from London to the North. Its name is derived from Chor, a stream that rises at Heapey, two miles distant, and after a short course along the edge of the town, joins the Yarrow and empties into the Douglas. A court-leet and baron was held here for the manor until 1827, when it was discontinued. The manor now belongs to the Fazakerleys, after having passed through the hands of the Sherburnes, the Chorleys, and the Norman families of Ferrers and Lacy. Within the present century the population has more than doubled. In 1801 it was 4516; in 1831, 9282. Seventy years ago the whole town consisted of one irregular street with a shop built across it; now the streets are wide and amount to 67, with a market-square, and about 1820 houses. The town is lighted with gas by a company formed in 1819, and is partially supplied with water by another company formed in 1823. The chief articles of manufacture are calicoes, muslins, and ginghams. Eight cotton-mills and printing and bleaching establishments find employment for a considerable part of the population. The Leeds and Liverpool canal, which joins the Lancaster canal at Whittle-le-woods, passes within about a mile E.S.E. of the town, and furnishes the means of conveying the flags, slates, and mill-stones which are got out of the quarries in the neighbourhood. Coal of good quality is abundant, and in 1833 a large bed of iron ore was discovered near Gillibrand Hall. Lead and carbonate of barytes are found in the Anglezark mines, four miles distant. About one-fourth of the land is arable, and the remaining three-fourths pasture and wood. There are four annual fairs, three of which are principally for cattle, and the last for woollen cloth, hardware, and pedlery. The market is held on Tuesday and Saturday. The town-hall, the basement area of which is used as a market-house, is a stone building, built in 1802 at the sole expense of the late John Hollinshead, Esq. Above this are rooms for the transaction of parochial and public business. The local authority is vested in a constable and visiting magistrates, who hold a petit-sessions once in three weeks.

Chorley was a chapelry in the parish of Croston until 1793, when it became one of three independent parishes, into which the former was divided. The living is a rectory in the archdeaconry of Chester. The parish church, dedicated to St. Lawrence, is an antient structure, supposed to be of Norman origin. The tower is a later erection. In this church a court is annually held by the bishop of Chester, at which he presides by proxy, for the swearing-in of churchwardens for all the parishes in the hundred of Leyland, for proving wills, and for taking out letters of administration. In the patronage of the rector of the parish church is St. George's, an elegant modern structure, built by the parliamentary commissioners at the cost of 13,707*l*. 16*s*. 9*d*., and opened for public worship in 1825. Besides the churches there are dissenting chapels for the Unitarians, Independents, Wesleyan Methodists, and Baptists; and at Weldbank, about a mile south of Chorley, is the Catholic chapel. In the various Sunday schools 2135 children receive instruction. The Grammar-school, adjoining to the churchyard, has but a very small endowment, so that the boys educated there are not taught gratuitously. There is a large and handsome school, conducted on Dr. Bell's plan, built and supported by public subscription; there are also infant schools and a Catholic day-school, which afford gratuitous instruction to nearly 1000 children. Six almshouses, having gardens and a donative of 2*l*. per annum attached to each, were built in 1682 for aged women and widows. Other charities, amounting to nearly 30*l*., are annually distributed among the poor. In 1828 a dispensary was established. The surrounding country is very picturesque, particularly towards the vale of the Ribble. On the north-west of the town is Astley Hall, an antient mansion, the seat of Sir H. P. Hoghton, Bart., and a little farther from the town, in the opposite direction, is Duxbury Hall. The townships adjoining Chorley are Heapey, Hoghton, Wheelton, and Withnell, and Whittle-le-Woods. (*Communication from Lancashire;* Robinson's *Description of the Parish of Chorley*, 1835.)

CHORUS, among the Greeks, was a number of persons, male or female, who sang melodies accompanied with dancing. The chorus appears to have been of Doric origin, and the Doric dialect continued to be chiefly used, even in the choral songs of Attic tragedies. (Müller's *Dorians*, vol. ii., p. 381.) Originally the choral performance was a separate exhibition, and was of a religious character: hymns were chanted in honour of Dionysus and other gods. Afterwards an actor was added by Thespis, who first introduced the dialogue; other changes were made by his successors, especially Phrynichus, till a second actor was added by Æschylus, who embodied the chorus in the constitution of the Greek drama, as a part and only a part of the

representation. Many explanations of the object of the chorus have been offered by different writers. It would certainly give a very imperfect idea of its office, to say that it was only retained in order to give the other actors breathing-time, and to prevent a break in the performance. The chorus may be regarded rather as the representation of the aggregate body of spectators: the chorus generally gave utterance to those emotions of pleasure or sorrow which the audience might be supposed to feel. They sometimes took upon themselves to give instruction or to administer reproof.

The tragic chorus consisted at first of fifty, afterwards of fifteen persons; the comic chorus consisted of twenty-four. According to Julius Pollux (*Onomast.* iv. 15), the number of the tragic chorus was abridged after the performance of the Eumenides of Æschylus: the alarm caused by fifty of these ladies was too great. The chorus entered into the orchestra, and remained there performing their evolutions, and observing the thymele or altar, which was in the middle of the orchestra, as the centre of their movements. As they sang they moved in a dance, suited to the subject of their song, and modulated by the accompanying music: sometimes the movements of the dance were so appropriate as to convey to the spectators the full meaning of the chorus, independently of the words of the song. The perfection to which the Greeks carried their skill in affecting an audience by the harmonious union of dancing and music forms one of the main differences between the antient and modern theatre. The modern ballet (properly so called) will probably give the best idea of what this combination was: but by the ballet (properly so called), we understand a ballet which is a species of drama, and not what is now ordinarily presented as a ballet. The songs of the chorus consisted of three parts, the strophe (or *turning*), the antistrophe (*opposite turning*), and the epode (*after-song*): during the first they turned from right to left, during the second from left to right, and during the third they stood still in front of the spectators. When they sang, they all sang: when they took part in the dialogue, one only, the coryphæus or leader of the chorus, spoke, from the top of the thymele; and hence in addresses to the chorus there is a constant change of number—*thou* and *ye*. (Schlegel, *Transl. in Theatre of the Greeks*, p. 265.) Frequently they divided into two sets, who, by means of their two leaders, carried on a separate dialogue, which generally revealed their sentiments on the progress of the plot, their fears, anxieties, and hopes. They also chanted hymns of supplication or thanksgiving to the gods.

The choruses at Athens did not perform exclusively in the theatre, but on many occasions when there was no scenic representation at all. At the Panathenæa and the Thargelia, and at the Gymnopædia of Sparta, choruses of men and boys sang. All choruses at Athens were provided, equipped, and instructed, by persons appointed by the several tribes. [Choragus.]

CHORUS, in music, a composition sometimes in two or three, but generally in four parts, sung by many voices, accompanied by the whole band when performed in an orchestra or on the stage, but by the organ alone when sung in a choir. The chorus of the oratorio and opera has full instrumental accompaniments, but that of our cathedral services and anthems is written with only an organ accompaniment.

The term Chorus is also applied in an aggregate sense to the whole body of singers performing the chorus.

A Double Chorus is in eight vocal parts, and sung by two choirs. Many of Handel's choruses in *Israel in Egypt*, in *Solomon*, and in *Deborah*, are of this kind.

CHOSE IN ACTION is a technical term in the law of England which denotes that kind of property of which the owner is not in the actual possession or occupation, though he has a legal right entitling him to obtain the possession by an action or suit. This sort of property is, for this reason, called a thing (*res*), or *chose* in *action*, in contradistinction from property in *possession*. Thus if I contract to buy a quarter of wheat out of a large quantity, and the seller, in breach of his engagement, refuses to deliver it, my interest in the wheat under the contract is a property to which I have an absolute right, but which, as I have not bought any specific parcel of wheat, I can only reduce into possession through the medium of an action. And as long as I have only the right of enforcing the delivery of the wheat, or an equivalent in damages, and not the actual possession, my property in this respect is a chose in action, being, as a property, a thing rather *in potentiâ* than *in esse*. (Blackstone's *Comm.*, vol. ii., p. 397.) In like manner money due upon a bond or a bill of exchange is a chose in action; and also the right to compensation for damage sustained by means of the breach of any kind of contract.

The antient policy of the English law, in discouraging all contracts tending to promote litigation, introduced a rule that property in action merely, and not in possession, could not be assigned or transferred to any third person. This rule has in modern times received considerable modification. In the familiar instance of bills of exchange and promissory notes (which are strictly choses in action), an indorsement not only transfers to the indorsee the absolute right to the sum to be recovered, but also enables him to sue in the common law-courts upon the bill or note in his own name. Courts of equity in other cases protect assignments of choses in action; but in these cases the assignee must sue in the name of the original contractor, whom the law, regarding the assignment, which it does not sanction, as a nullity, treats as the party still entitled, if the assignee proceeds at law. [Assignment.]

CHOSROES. [Khosru.]

CHOTEESGHUR. [Nagpore.]

CHOUANS was the name given to the irregular bands of royalists in the west of France, who continued in arms after the organized insurrection of La Vendée had been suppressed by the first Consul Bonaparte in the year 1800. The Chouans were chiefly on the right bank of the Loire, in the provinces of Bretagne, Maine, and Normandy, while the Vendeans, properly so called, were on the left or south bank of that river. The Vendeans were a regular royalist party, possessing a considerable extent of country, having a kind of discipline in their army, and fighting honourably for their cause. The Chouans, who continued in arms after the Vendeans had submitted, were straggling, disorderly bodies of men, marauding over various provinces of France, hunted after by the troops of the government, and having no fixed station. Some of the royalist officers who had served in the civil wars of La Vendée became chiefs of Chouan parties, but the parties themselves were swelled by many disorderly and desperate characters, who continued a struggle which had become hopeless chiefly for the sake of revenge and plunder. Frotté and George Cadoudal became the chief leaders of the Chouans, after the Vendean chiefs d'Autichamp, Bernier, Bourmont, Chatillon, Suzannet, &c., had made their submission to the first consul. Frotté was taken and shot. Cadoudal withdrew to England, then returned to France, and continued a desultory kind of warfare, mixed up with conspiracies against the first consul, for effecting one of which he went secretly to Paris, and remained several months in that city unknown to the police. He was at last arrested, after killing several of the police, tried, and executed in June, 1804. [Bonaparte.] The Chouans scattered over France had been in great measure put down, and a vast number of them executed previous to Cadoudal's death; still we read of Chouan parties occasionally as late as 1806, under the empire, when one of them arrested the bishop of Vannes in the department of Morbihan and exacted a considerable sum for his ransom. They had then degenerated into mere robbers. In general the name of Chouans was used in an unfavourable sense, while that of Vendeans was respected even by their enemies.

CHOUGH. [Corvidæ.]

CHOUMLA. [Shumla.]

CHRISM, sometimes written **CRISOME**, in its strict interpretation means 'unction,' from the Greek χρῖσμα (chrisma), ointment; but is more generally received as the name for oil consecrated by the bishop and used in the Romish and Greek churches in the administration of baptism, confirmation, ordination, and extreme unction: and is, or used to be, prepared on Holy Thursday with much ceremony. Ducange (*Glossar. ad Script. Med. et Infimæ Latinitatis*, edit. Francof. ad Mœn., 1681, tom. i., col. 973) says there are two kinds of chrism, the one prepared of oil and balsam, used in baptism, confirmation, and ordination, the other of oil alone, consecrated by the bishop, antiently used for the catechumens, and still used in extreme unction. (See also Durand's *Rationale Divinorum Officiorum*, lib. vi., cap. 74, 84.) The word crisome is also found applied to the cloth which was laid over a child's face when

baptised, to prevent the unguent from running off. (See the *Liturgy* compiled in the 2nd year of Edward VI.) Children likewise who die in the first month are called Chrisomes in our Bills of Mortality, probably from the circumstance of the linen-cloth having been so recently laid upon them.

CHRIST, JESUS, was born at Bethlehem, a city of Judæa, in the days of King Herod. The first chapter of St. Matthew contains the genealogy of Jesus deduced from Abraham through David to his reputed father Joseph: the third chapter of St. Luke contains his pedigree from Joseph to Adam. From Joseph to David, the two genealogies are entirely different; but this discrepancy is satisfactorily explained by the commentators. The birth of Jesus was miraculous; 'when his mother Mary (according to the words of St. Matthew) was espoused to Joseph, before they came together, she was found with child of the Holy Ghost.' Joseph, who intended to put her away privately, being warned in a dream by the Angel of the Lord, that what was 'conceived in her was of the Holy Ghost, took unto him his wife and knew her not till she had brought forth her first-born son: and he called his name Jesus.' (Matth. i.) Herod was much troubled at the miraculous circumstances which attended the birth of Christ, and at the coincidence of the place of his birth with the prophecies. In order therefore that the infant might with certainty be destroyed, he gave orders that all the male children in Bethlehem and the neighbourhood under two years of age should be put to death; but Jesus was saved by his parents, who were warned by an angel in a dream to take the child into Egypt. This part of the sacred history is recorded by St. Matthew only. According to St. Luke, when the days of the purification of Mary were accomplished, his parents took him from Bethlehem to Jerusalem to present him in the Temple, after which they returned to their own city Nazareth in Galilee. At twelve years of age Christ disputed with the Jewish doctors in the Temple at Jerusalem, whom he astonished by his answers and his understanding. Towards his parents his conduct was an example of filial obedience. He was not above following the business of his reputed father, which was that of a carpenter; and until about his thirtieth year he fulfilled the common duties of life in an humble and obscure station. His public ministry was preceded by the warnings and admonitions of John the Baptist, the son of a Jewish priest, who called upon the people to repent and believe, for the time was fulfilled, and the kingdom of God was at hand. Christ was baptised by John in the river Jordan, and shortly after commenced his ministry, being about thirty years of age. For about the space of three years he was engaged in the work of promulgating his doctrines, and confirming his divine mission by numerous miracles. In order to diffuse that religion which he came to make known, Christ selected a certain number of persons to be his constant companions, to learn his doctrines, to witness their influence, to testify to the miracles by which their truth was demonstrated, and to be prepared to propagate after his death the truths which he had thus made known. The twelve persons whom he chose are called the Twelve Apostles. They were ignorant persons, who possessed neither wealth, rank, nor education, and yet they were called to root out opinions which were deeply implanted in men's minds, and to overturn systems strengthened by all the influence which antient and venerable authorities exert over the mind. Christ next appointed from among his followers seventy disciples, whom he sent by twos to every place which he himself intended to visit. (Luke x. 1.) This appointment of the seventy disciples is not mentioned by the other evangelists. Many of the Jews being convinced by Christ's preaching, and the miracles which he wrought among them, of his divine mission, the Jewish priesthood were alarmed, and sought some means of accomplishing his death. Being betrayed by Judas, one of the twelve whom he had chosen, Christ was taken before the Jewish court of the Sanhedrim, which had the cognizance of offences against religion, and from thence to the tribunal of Pontius Pilate, the Roman procurator or administrator of the revenues of the province. Before the former he was accused of blasphemy, a charge which was supported by two false witnesses; and before Pilate as a seditious person, and a stirrer up of disaffection, a charge which was also totally without foundation. But the Jews clamoured for his death; and though Pilate saw nothing in the accusations brought against him worthy of capital punishment, he was sentenced to death in compliance with the clamour of the people, and apparently also from fear of some disturbance. In the midst of their scoffing and jeers he was led to the place of execution, and crucified, with circumstances of the greatest cruelty, between two criminals. On the third day Christ rose from the grave, according to his own prediction (Mark x. 34), and during forty days previous to his ascension into heaven he appeared among his disciples, whom he instructed more fully concerning the nature of his mission, which he now left in their hands. Fifty days after his ascension, the disciples, being assembled in Jerusalem at the feast of Pentecost (Acts ii.), were suddenly 'all filled with the Holy Ghost,' and endowed with the gift of speaking all languages. On this occasion three thousand persons were converted and received baptism. Being thus fitted for disseminating in every part of the world the principles of the new religion, the apostles and disciples whom Christ had appointed, scattered themselves throughout various countries, but principally in the east. Matthias had been chosen to supply the place of Judas, the traitor, and an additional disciple, named Saul, afterwards Paul, a person of education, and though a Jew, a Roman citizen of Tarsus, was especially called to co-operate with them.

The history of Christ has been written by four different individuals, whose accounts are received by the Christian world, and some of the arguments for the credibility of their testimony are founded upon the mode in which they accomplished their task. Matthew, who had been a collector of customs, wrote his Gospel in Hebrew for the use of the Jews soon after Christ's death; Mark is believed to have written under the direction of Peter, for the use of the Christians at Rome; Luke, whose Gospel was written for the Heathen converts, was a physician, a companion in the labours of St. Paul, and is supposed to have written his account of Christ while travelling with the apostle; John's Gospel was written after all the preceding, and notices circumstances which the other evangelists had passed over. That part of the New Testament which follows the four Gospels was also written by St. Luke, and gives the Acts of the Apostles, and the history of Christianity, for about thirty years after Christ's death.

The primitive assemblies of the converts to Christianity were called Churches (Ἐκκλήσιαι). The converts at Jerusalem formed the earliest Christian society. The church of Antioch, which was founded by Paul and Barnabas, was the second; and its members first received the name of Christians, having previously been called Nazarenes, by way of derision. The first churches or Christian communities were those of Jerusalem, Antioch, Ephesus, Smyrna, Athens, Corinth, Rome, and Alexandria. The churches founded by the apostles were regarded with peculiar veneration in after times. Their authority was appealed to on points of discipline and doctrine, as it was conceived that the letter and spirit of the apostolical regulations had been more rigidly adhered to. The church of Jerusalem may be regarded as the mother of all other churches; but the church at Rome, then the capital of the world, subsequently became, with the churches of Antioch and Alexandria, which were respectively capitals of Roman provinces, by far the most important of all the churches. The four churches of Jerusalem, Antioch, Rome, and Alexandria were formed in the order in which they are mentioned, though some doubt exists as to the title of the church of Rome to priority over that of Alexandria. The church of Rome became the metropolitan of the west, while that of Antioch was regarded as the chief of the eastern churches. As the apostles extended their travels, churches were planted in various parts of Asia. Paul and Barnabas visited the islands of Cyprus and Crete, and various parts of Greece, where they made converts to Christianity. In a second visit to the churches which were formed by Paul, he regulated some of the practices into which the converts had fallen. At Corinth he remained eighteen months, during which period he exerted himself to establish firmly the faith of the Christian believers, which in that church was exposed to peculiar dangers. When unable to visit distant churches, he addressed them in 'Epistles.' Paul next directed his attention to the west of Europe, to nations 'that were yet rude and barbarous.' There is no certain record of this portion of his travels. The writings and labours of St. Paul, who is emphatically called the apostle of the Gentiles, form the most important part of the history of the second period of

Christianity. In less than forty years after the death of Christ the Gospel had been preached in every country of the then civilized world, and in some countries which were in a state of barbarism. In the year 68, that is 37 years after Christ's death, Peter and Paul suffered martyrdom at Rome.

The records as to the other apostles do not afford an adequate idea of the extent of their labours. John was banished to the island of Patmos by Domitian, and there wrote the Revelations. He was subsequently permitted to return to Ephesus, where he wrote his gospel and epistles. He was the last survivor of the apostles, and died a natural death at the close of the first century, about the year 98. The seven churches mentioned by John in the Revelations are Ephesus, Smyrna, Pergamus, Thyatira, Sardis, Philadelphia, and Laodicea.

The Christian religion, as founded by Jesus Christ, and as accepted by all Christians, whatever differences there may be in their opinions, rests for its authority upon the proofs of his divine mission. The history of Jesus Christ, as given in the Four Gospels, presents us with a series of miracles wrought by him from the commencement of his ministry to the crowning miracle of all, his resurrection from the dead, and his ascent into heaven. Whether the miracles recorded in the Gospels actually took place, or not, is a matter of historical inquiry which must be determined from the whole evidence, like any other historical fact. If the miracles are admitted actually to have taken place—if the dead, for instance, were actually raised to life, there are very few who will not allow that He who performed these miracles must have had a particular power which other men have not. It has sometimes been said that the miracles, if true, do not prove a divine mission. But if a man proclaim his divine mission, and perform miracles in confirmation of it; if he predict his own death and resurrection, and actually do die and rise from the dead in accordance with his prediction—this will ever seem to the mass of mankind sufficient proof of a divine mission, and indeed it would be difficult to say what other proof can be asked for. The second proof of the divine mission of Christ to which Christians appeal is contained in the types and prophecies of the Old Testament, which, under various figures, and in a great variety of expressions, of different ages, refer to the future coming of the Messiah, and to his kingdom. A comparison of the passages of the prophets with the passages in the history of Christ, and the application of many of these passages of the prophets by the Evangelists, and even by Christ himself on several occasions, are considered by all Christians to be a proof of the divine mission of Christ, and also a collateral evidence for the truth of those Gospels in which the prophecies are thus fulfilled. The predictions of Christ himself as to his own death, the destruction of Jerusalem, and the condition of his followers after his death, are also appealed to as evidence of his divine mission. The predictions of the prophets were accomplished in Jesus, and the prophecies of Jesus were accomplished in the subsequent history of the religion which he founded.

The diffusion of the gospel, after the ascension of Jesus, by means at first apparently so insufficient for the purpose, is also viewed by all believers as a proof that his doctrines were not of man. And further, that the early preachers of Christianity sincerely believed what they taught, is shown by their inflexible zeal in diffusing the Gospel amidst sufferings and persecutions even unto death; and this strong conviction in the minds of those who had the best opportunity of learning the genuine doctrines of Christianity must be taken as confirmatory evidence of their divine origin.

The religion which Christ came to teach has for its great sanction, the resurrection of the dead, and the doctrine of future rewards and punishments. In the Mosaic law there is no declaration of the doctrine of the resurrection, and of course the sanction of rewards and punishments in a future life forms no part of the law. Before the coming of Christ indeed there was a partial belief of a resurrection among some of the Jewish sects (Matth. xxii. 23; Acts xxiv. 15): but the preaching of Jesus proclaimed in the clearest terms a general resurrection, and rewards and punishments in a future life for all. It is this firm belief in a future state, which gave to the primitive Christians their inflexible courage and their readiness to suffer death; and which, as it was one of the main causes of the success which attended the preaching of Christianity in its early history, so is it now the vital spirit of the Christian religion. [CHRISTIANITY.]

CHRIST CHURCH, OXFORD. In 1524, Cardinal Wolsey, with the assent of King Henry VIII., announced to the University of Oxford his design to found a college there, the foundation of which he almost immediately commenced. By two bulls, one dated in 1524, the other in 1525, he obtained from Pope Clement VII. leave to enrich his college by suppressing twenty-two priories and nunneries, the aggregate revenues of which were estimated at nearly 2000*l*. The king's patent, after complimenting the cardinal's administration, enabled him to build his college principally on the site of the Priory of St. Frideswide: and the name, originally intended to be 'The College of Secular Priests,' was now changed to CARDINAL COLLEGE. The secular clergy in it were to be denominated 'The Dean and Canons Secular of the Cardinal of York,' to be incorporated into one body. He was also authorized to settle upon it 2000*l*. a year clear revenue. By other patents and grants to the dean and canons, various church-livings were bestowed upon them, and the college was to be dedicated to the praise, glory and honour of the Holy Trinity, the Virgin Mary, St. Frideswide, and all Saints. With respect to its constitution, it appears from Wolsey's statutes, still preserved in the college, that it was to be a perpetual foundation for the study of the sciences, divinity, canon and civil law, the arts, physic, and polite literature, and for the continual performance of divine service. The members were to be a dean and sixty regular canons, with forty canons of a second order. The Society, as Wolsey planned it, was to consist altogether of 160 persons, but no mention was yet made of scholars or students. This constitution continued from 1525 to 1530, when Wolsey was deprived of his power and property, and, for two years after, the foundation appears to have been interrupted, if not dissolved. It was to Wolsey's honour that, when all worldly prospects were closing upon him, he pleaded for nothing so earnestly as that his Majesty would be pleased to suffer his college to go on. What effect this had is unknown, but the urgent entreaties of the members of the society, and of the university at large, were at length successful, while at the same time the king determined to deprive Wolsey of all merit in the establishment, and transfer the whole to himself.

Accordingly, in 1532, the society was refounded by the king, under the title of 'King Henry VIII.'s College in Oxford.' The patent is dated July 8th, and orders that the said college be again founded on the same site, ground, and circuit, dedicated to the Holy Trinity, St. Mary, and St. Frideswide, and endowed with 2000*l*. yearly, for the maintenance of a dean and twelve canons, who should form a chapter, or body corporate. Dr. John Hygden, President of Magdalen College, who had been Wolsey's dean, was again appointed to the office. This second foundation continued until May 20, 1545, when the charter was surrendered by the dean and canons into the hands of the king, who dismissed them with yearly pensions, to continue until they could be otherwise provided for.

The king then changed the college into a cathedral church, translating the episcopal see from Oseney where it had been established in 1542. The name of the college now was 'The Cathedral Church of Christ in Oxford of King Henry VIII.'s Foundation;' and the society was declared to consist of a bishop with his archdeacon, (removed from the church of Lincoln,) and a dean and eight canons. All the estates were assigned to the dean and canons, on condition of their maintaining three public professors, of Divinity, Hebrew, and Greek, one hundred students in theology, arts, or philosophy, eight chaplains, and a numerous choir. No change afterwards took place in the number or constitution of the society, except the addition of one studentship. In Queen Elizabeth's reign, the family of Venables of Cheshire giving an estate to this college, it was agreed, upon a composition, that the nomination of a student should be in the heirs of that family, which was confirmed by Act of Parliament in 1601, 43 Eliz. Queen Elizabeth also ordered, in 1561, that there should be an annual election from Westminster School. The other vacancies are filled up by the dean and chapter. By the last letters-patent which were granted from King Henry VIII., the college was to be governed by statutes subsequently to be provided, but none were ever given.

The college is governed by the acts of the dean and chapter, revokable at their pleasure. There is no visitor but the king, or persons commissioned by him.

The benefactions to this college enumerated by the writers on Oxford are few, and consist chiefly of the profits arising from tenements, or sums of money, bequeathed as exhibitions, or for the better maintenance of poor students. Among them the names of Dr. Chaloner, canon of Windsor; Joan Bostock, of New Windsor; Thomas Whyte, citizen of London; William Wickham; William Thurston, Esq., of London; Dr. Richard Gardiner; Dr. Busby, Master of Westminster School; Lady Holford; and Bishop Fell, deserve especial enumeration. It may be observed that the ample endowment of the last foundation, the increasing prosperity of the society, and the rank and opulence of its members, rendered such helps less necessary in this College than in any other of the same university.

The buildings of this extensive and noble establishment have undergone as many revolutions as its foundation. Had Wolsey lived to complete his plan, it would probably have exceeded that of any college in Europe. The priory of St. Frideswide formed its principal site, the church of which serves both for the cathedral and the college chapel, and is at least of Norman, if not in some parts, of earlier date. This church is in the shape of a cross, with a spiral steeple in the centre 144 feet high. The length from east to west is 154 feet. The cross aisle from north to south 102 feet. The height of the roof in the western part 41½; in the choir 37½; and the breadth of the nave and side aisles 54 feet. It has a cloister, and the chapter-house, built about the thirteenth century, is one of the finest specimens of the early style of pointed architecture in England. The first part of the college finished by Wolsey was the kitchen, the fabric of which still retains its antient shape. The workmen next made room for the hall, by levelling a part of the old city wall which ran from Merton and Corpus College gardens behind St. Frideswide's church. They pulled down likewise the parish church of St. Michael at Southgate, standing where the Hebrew professor's lodgings are now built. In the four years which elapsed between laying the first stone and his disgrace, Wolsey had the satisfaction of seeing the kitchen, hall, the whole of the south side, with the greater part of the west side of the large quadrangle, finished according to his design; and to hear the praises which were lavished from all quarters, both at home and abroad, upon his love of literature, his taste, and his munificence. The hall is 115 feet by 40, and 50 in height. The great quadrangle, nearly a square, 264 feet by 261. The north side was intended to be occupied by a large and handsome church, but scarcely had this portion been commenced and the foundations laid, when the fall of its patron put a stop to the work, and this side of the quadrangle remained unfinished for more than a century. Wolsey's quadrangle was surmounted by an open battlement with pinnacles, instead of the present Roman balustrade which was added by Bishop Fell. The north side was finished after the restoration of King Charles II. The western gateway was completed by Sir Christopher Wren in 1682, when the bell was transferred to it commonly called Great Tom, which had formerly been the clock-bell at Oseney. The more modern buildings of this college are Peckwater and Canterbury quadrangles. Peckwater derives its name from an inn or hostel which stood upon the same site, and had been given to St. Frideswide's monastery; it received its present form and elevation in 1705. The library, which forms the south side of Peckwater quadrangle, was commenced in 1716, but was not wholly finished till 1761. The old library stood on the north side of the chaplain's quadrangle, on the other side of the college, which antiently had been a refectory to the convent of St. Frideswide. After the completion of the new library, about 1775, it was converted into rooms. Canterbury quadrangle, adjoining Peckwater, stands on the site of what was formerly Canterbury college or hall. King Henry VIII. transferred this hall with other buildings to the college, subsequent to which it was repaired and fitted up for the reception of students, and remained in that form and condition till 1773, when the old buildings were removed, and the square reconstructed upon a new design, chiefly through the munificence of Dr. Robinson, then Lord Rokeby, archbishop of Armagh, who gave more than 4000*l.* for that purpose. The Doric gateway was erected in 1778, by Mr. J. Wyatt.

Of the eminent persons who have been educated in this college it is impossible to make an enumeration, the magnitude of the establishment, and the high rank in the learned professions to which it has usually led, would extend the full list to a volume. Among the deans who have presided over the college, may be mentioned John Piers and Toby Matthew, afterwards archbishops of York, Corbet bishop of Norwich, Brian Duppa bishop of Winchester, Dean Aldrich, and Atterbury bishop of Rochester. Among the archbishops and bishops who have received their education here, we find the names of Bancroft, Prideaux, Sanderson, Potter, and Tanner; among the statesmen and lawyers, Sir Dudley Carleton, Sir Edward Littleton, Edward Sackville Earl of Dorset, Lord Littleton, William Earl Mansfield, and George Canning; among poets and orators, Sir Philip Sydney, Ben Jonson, Otway, and Villiers Duke of Buckingham. To these may be added Hackluyt, Camden, Gunter and Hooke the mathematicians, Meric Casaubon, Littleton the compiler of the Latin dictionary, William Penn the founder of Pennsylvania, Locke, Lord Bolingbroke and Desaguliers.

The present society of Christ Church, including students, independent members, under-graduates, &c., consisted Dec. 31, 1835, of 920 persons. The present dean is Thomas Gaisford, D.D. (Wood's *Annals of the University*; Chalmers' *History of the Colleges and Halls of Oxford*; Ingram's *Memorials of Oxford*, 4to., 1834; *Oxford Univ. Calendar*, 1834.)

CHRISTCHURCH, a parliamentary borough, market-town, and parish, in the south-west extremity of Hampshire, is pleasantly situated within the angle formed by the confluence of the Avon and the Stour, in the hundred of Christchurch, and division of New Forest West, 20 miles W.S.W. of Southampton, and 93 S.W. from London in a straight line. Its name is derived from its church and antient priory, founded by the West Saxons, in the reign of Edward the Confessor, for a dean and twenty canons. Ranulph Flambard, bishop of Durham, rebuilt the priory in the time of Rufus, and its revenues were greatly augmented by Richard de Redvers, or Rivers, earl of Devon, to whom the manor was given by Henry I. At the dissolution the annual income was 544*l.* 6*s.* (*Speed.*) Fragments of the priory walls are still standing, and of the castle keep, which are more than ten feet in thickness, and in the Norman style. The earliest notice of Christchurch is in the Saxon chronicles, where it is said to have been the military position of Ethelwold during his revolt against Edward. By the Saxons it was called Twyneham-Bourne, and Tweon-ea; and in Domesday Book, where it is mentioned as a burg and royal manor containing thirty messuages, it is called Thuinam. The church is a very fine old structure, in the form of a cross, partly of Norman architecture. From some remains that have been discovered, the town is supposed to have been of Roman origin. In the vicinity appears the site of a camp and entrenchments, with several tumuli and barrows, which have contained human bones. The living is a vicarage, in the diocese of Winchester.

Though the town is a corporation, it is wholly under the jurisdiction of the county magistrates. It sent two members to parliament since the time of Elizabeth; the number was reduced to one by the Reform Act, and the parliamentary borough was enlarged by the Boundary Act. The town is not lighted nor regularly paved, but is amply supplied with water. The salmon fisheries on the coast and river have greatly declined. The population in 1831 of the whole parish was 5344, and of the new parliamentary borough 6077. There is a free grammar-school, a national and Lancasterian school, and several endowed charities. The rivers Stour and Avon, after uniting about a mile and a half below the town, flow into Christchurch Bay, and form a spacious harbour; but from being obstructed by a moving bar of sand, it can be entered only at high water by small vessels drawing five or six feet of water. There is high water twice every tide. Good anchorage in six fathoms water is found in the bay, east of the harbour, two miles from shore. The town has little trade, and does not appear likely to improve in that respect.

CHRIST'S HOSPITAL, London. The hospitals of Christ, Bridewell, and Saint Thomas the Apostle, were founded by the same charter of King Edward the Sixth, dated 26th of June, 1553; for the support of which he granted to the mayor and commonalty, and to the citizens of London, numerous possessions within the city of London, and the counties of Middlesex, Essex, Hertford, Buckingham, Cambridge, Kent, Derby, and York. Christ's Hos-

pital was established upon the site of the house of Mendicants or Grey Friars, in Newgate Street, about five years after the king's grant; when about four hundred orphans were admitted, and clothed in russet, which was soon afterwards changed for the dress which they now wear, viz., a blue coat or tunic, reaching to the feet, with yellow stockings, and a round bonnet or cap. The institution has little or no income under the charter. It is apprehended that the estates which were given under it to the city of London were afterwards apportioned to the royal hospitals as the citizens thought fit. All its other estates can be traced to legacies and donations of different periods. At the suggestion of Sir Robert Clayton, then lord mayor, and a considerable benefactor, king Charles II., in 1676, granted a second charter, allowing 1000*l.* a year, for seven years, to establish a mathematical school for forty boys, and an annuity of 370*l.* 10*s.*, payable at the Exchequer, for the especial purpose of educating and placing out yearly ten boys in the sea-service.

The greater part of this hospital was involved in the destructive fire of London in 1666; but by the zeal and liberality of the corporation of London, aided by donations, loans, and the operation of the revenues of the hospital, it soon revived, and was rebuilt under the able direction of Sir Christopher Wren. The buildings, however, having, to a certain extent, fallen into decay, from their antiquity, and the funds of the charity being unequal to their entire restoration upon a plan of suitable uniformity and convenience, it was resolved, at a general court of the governors, on the 28th of January, 1803, to open a subscription for that purpose, when the corporation of London gave 1000*l.*; several of the city companies followed the example, and the donations for this purpose up to 1833, chiefly of individuals, amounted to 38,676*l.* The great work of rebuilding was commenced in 1825: and no expense has been spared in rendering those parts of the hospital which have been completed under the direction of the late Mr. Shaw, at once durable and magnificent.

The governors of the Hospital are the mayor and commonalty of the city of London, represented by the lord mayor, aldermen, and twelve common council-men, who are chosen by the rest of the common council out of their own body, according to an act of parliament obtained in 1782, to settle the disputes between the city of London and the Hospital. Besides the corporation, noblemen and gentlemen of all ranks are governors, who become benefactors to the amount of 400*l.* The number of governors of this kind is not limited. A president is at the head of the charity, who is elected for life, by the body of the governors, and is always an alderman of London. The governors present to the charity in the following manner. The lord mayor presents two, one being extra, as lord mayor; the president, two, and one as alderman; the other twenty-four aldermen present each one annually, provided any children are admitted. If the lord mayor should be president, he has two presentations as lord mayor, and two as president. The treasurer has two presentations, and one in his turn as governor. The ordinary governors fill up the remaining number in rotation, beginning each year when the last presentation ceased.

In 1683 the governors erected a handsome building in the town of Hertford, for both boys and girls at a very early age, where they are nursed and instructed until they are rendered capable of receiving the more advanced education of the foundation in London. The establishment at Hertford, when full, contains 416, of whom about 200 are taught the classics.

The accommodation in the two establishments in London and at Hertford is for 1156, including 80 girls.

In London there are four classical masters, two writing-masters, and two ushers; a mathematical, drawing, and singing master. At Hertford, there are a classical master, writing-master, two ushers, and two mistresses to the girls' school; besides nurses, &c., at each.

The whole gross income of the charity in 1815 was 43,386*l.* The expenses for that year, 40,420*l.* The governors enjoy the patronage of the rectories of Wormshill, in Kent, and Colne Engaine, in Essex; of the vicarages of Clavering cum Langley, Ugley, and the perpetual curacy of Berden, in Essex; of the vicarages of Horley, in Surrey, and Endford, in Wilts; and, alternately with the Haberdashers' Company, of the vicarages of Albrighton, in Salop, and of Bitteswell, Diseworth, and Wigston, in Leicestershire, and the chapelry of Leiston, in Suffolk. (Carlisle's *Descr of the Endowed Grammar Schools of England and Wales*, 8vo., Lond., 1818, vol. ii., pp. 20—37; and the *History of Christ's Hospital*, by the Rev. William Trollope. 4to. Lond., 1834; to which latter work the reader will refer for more minute and copious details.)

CHRIST'S THORN. [PALIURUS.]

CHRISTIANIA, THE PROVINCE OF, occupies the south-eastern portion of Norway, extending from 58° 48′ to 62° 40′ N. lat., and 7° 40′ to 12° 30′ E. long. Its greatest length from south to north is nearly 400 miles, and its average breadth not much short of 100 miles. According to the official statements, its area is 1580 Swedish, or 35,820 English square miles; it is therefore nearly 7000 square miles larger than Scotland. Its population is about 480,000.

The southern part of the province is washed by the Skager Rack, and bounded by a rocky and bold coast, which however only rises to a considerable elevation west of Fredrikvaern, towards the province of Christiansand. It is much indented, and contains several good harbours. The Bay of Christiania, or Christiania Fiord, stretches about 60 miles inland. At its entrance, where the Hval Oërne islands lie, it is about 15 miles wide, but it narrows gradually farther north, and is only eight miles across where it divides into two branches. These branches are from one to three miles wide, and at their respective extremities are situated the towns of Christiania and Drammen. The shores of the bay are formed by rocky but gentle hills, mostly covered with trees.

Along the western and northern side of this province extends the mountain-chain called Norrska Fjellen, or Norway Range, which commonly rises to the line of perpetual snow, and contains some summits far above it, as the Skagstöls Tind, which rises to more than 8500 feet; and the Sneehätten, which attains more than 8300 feet. These are the highest summits in the range, which in width occupies from 70 to 90 miles, this being the average distance between the inhabited places in the contiguous provinces of Christiania and Bergen. By far the greatest part of it is always covered with snow. Two roads traverse this chain. By the southern the town of Christiania is connected with that of Bergen. From Christiania it runs north-west to the northern extremity of the lake of Tyri, and hence along two of the upper branches of the river Drammen. It crosses the highest part of the range south of the Skagstöls Tind, and descends rapidly to the long and narrow Teroen Fiord, from whose shores it runs south-west over a hilly country to Bergen. The northern road leads from Christiania to Trondheim. It runs from Christiania to the southern extremity of the lake of Miösen, then along the beautiful eastern borders of the lake, and afterwards along the Lougen-Elf, nearly to its source, whence it traverses the highest part of the range, east of but near the Sneehättan. It afterwards descends through some valleys to Trondheim. On the uninhabited part of the range are built four small houses for travellers, as a refuge in snow-storms: they are called *field-stuer*, and the most elevated is 4563 feet above the sea.

The western and northern parts of the province are traversed by the numerous offsets of this range. Near the principal chain they are of great height, sometimes rising above the snow-line, as the Halling Skarven, which rises to more than 5400 feet. Farther east they are lower, but even at a distance of 15 or 20 miles from the coast they commonly rise to 1000 or 1500 feet. The valleys between these ranges are narrow, and have only small strips of cultivable land along their rapid rivers; but part of the declivities of the mountains are covered with high trees, and the mountains themselves afford silver, cobalt, and immense quantities of iron. Such is the country north of 61° N. lat., and west of 10° E. long., which contains about three-fourths of the province. The remainder is also very uneven, but the mountains rarely rise above the line of trees, and are clothed with fine forests. Most of them have a gentle ascent, which admits of cultivation; and there are also numerous level tracts between them, though nowhere of great extent, except at the town of Moss, on the eastern shores of the Bay of Christiania. The most fertile districts lie east and north-east from Christiania, along the rivers Glommen, Wormen, and the lake of Miösen, and are known by the names of Hedemarken and Guldbrandtsdalen. They produce rye, barley, and oats, in sufficient quantities to supply them as exports to the other districts of Norway

The eastern districts are drained by the Glommen, the largest river of Norway, which brings down the waters of the great lake of Miösen. Through the middle districts runs the Drammen-elf, whose numerous branches bring down all the waters descending from the Norrska Fjellen, between 60° and 61° N. lat. They unite about 25 miles from the mouth of the river, which falls into the western branch of the Bay of Christiania near Drammen. The southern districts are drained by the Louven-elf, which rises in the high Hardanger Field, runs for some time east, and then continues in a south-eastern direction to its mouth, near Laurvig, where it falls into the Skager Rack after a course of about 140 miles. In the most southern district is the lake Nord Söen, which receives the waters of a considerable mountain-district, forming part of the province of Christiansand. The lake is about 12 miles long, and enclosed with rocks. From its eastern extremity issues a powerful river, the Skeen-elf, or Brevig-elf, which forms some cataracts near the lake, but soon afterwards, at Skeen, becomes navigable for vessels of considerable burden: at its mouth is a bay, called Langesund. At the north-eastern extremity is the lake Fämund, or Fämundsöe (2352 feet above the sea), the largest of the lakes of Norway, about 24 miles long from south and north, and from two to five miles across. From this lake issues the Klar-elf, which enters Sweden, and falls into the lake of Wenern.

All the towns, except Kongsberg, are near the sea. On the east side of the Christiania Fiord is Frederikshall, on an inlet of the sea called Swine Sund, close to the boundary of Sweden, a fortified place with a harbour and 4800 inhabitants. It exports deals and iron, and has a few manufactures on a small scale. Near it, on a rock 400 feet high, is built the fortress of Frederiksteen, where Charles XII. of Sweden was killed in 1718. Frederikstad, at the mouth of the river Glommen, is a fortress, and has a harbour and arsenal. It exports deals: population, 2100. Moss, on the Christiania Fiord, with 2000 inhabitants, is a thriving place, and has twenty saw-mills and an extensive iron-work. In this place the convention was made in 1814, by which Sweden and Norway were united.

On the west of the Christiania Fiord is Drammen, with 7000 inhabitants, at the mouth of the river Drammen; it has a good harbour, and exports timber in logs. In its vicinity is a marble quarry, and higher up the river at Modum a cobalt-mine. Kongsberg, in a narrow wild valley on the Louven-elf, has 3800 inhabitants, and is a mining town; in its vicinity are silver mines, which once gave a considerable produce, but in the beginning of this century very little. Lately however the produce has considerably increased, and in 1828 it yielded more than 2000 marcs. In 1834 a lump of native silver of extraordinary size was found: this town contains a mining-school. Laurwig, at the mouth of the Louven-elf, has considerable mines in its neighbourhood, a good harbour, and 2000 inhabitants. Skeen and Porsgrund, two places on the navigable Skeen-elf, export a considerable number of deals. Near Tonsberg (1600 inhabitants) on the peninsula of Valloe, salt is made.

CHRISTIANIA, the capital of Norway, is in 59° 55′ N. lat. and 10° 50′ E. long., at the northern extremity of the Christiania Fiord, a bay extending about 60 miles inland, into which the river Agger falls close to the town. Except towards the bay, the town is enclosed by high hills and mountains, which on the north are about 5 miles distant, but on the other sides approach much nearer the town. The streets are wide and well paved; the pavement however inclines from each side to the centre of the street, which is thus converted into a common sewer. The houses have rarely more than two stories; but most of them are built of bricks, and a few of stone. It has four suburbs connected to it, which in parts are not paved. Among the public edifices are distinguished the new royal palace, the military academy, and the cathedral. In 1810 it contained hardly more than 10,000 inhabitants, but in 1826 not less than 20,581. This rapid increase is chiefly to be attributed to the circumstance, that Norway, by its union with Sweden, obtained an independent legislative government, which has its seat in this town, and by the erection of a university in 1811. The university was in 1833 attended by about 500 students, and possesses a library of 100,000 volumes, an observatory, a botanic garden, a museum, and other institutions. The sum of 33,000 dollars is annually allowed for its maintenance. Like the universities of Germany, it is rather a school for public officers, than intended to form men of science and learning. The courses last from four to six years, but the student is not bound to reside at the university the whole time. Besides the four faculties, which exist in every German university, Christiania may be considered as a mining academy; and some of the lectures are intended as a preparatory course for young men who are designed to be practical miners. There are besides a military academy, a grammar school, a commercial academy, and school for drawing, and also a society for promoting the prosperity of the country. Manufacturing industry has not made much progress, and the fabrics are woollen cloth, iron utensils, tobacco, &c. The trade in timber is considerable, though less than it was between 1801 and 1805. It exports principally deals and planks, and also a quantity of fire-wood, almost exclusively to England. The quantity of iron which is exported is not great. In one of its suburbs, called Opslo, alum is made to a considerable extent. (Von Buch's *Travels through Norway; Schubert's Reise durch Schweden, Norwegen, Lappland, &c.; Journal of Education, No. X.*)

CHRISTIAN KNOWLEDGE, SOCIETY FOR THE PROMOTION OF, was formed in the year 1698, and is the oldest society in the kingdom established for the education and religious instruction of the poor. It is an incorporated society, and is supported by the members of the church of England. Owing to the long time that it has been established, some of its early publications are inferior to works of a similar kind which have been more recently issued; and so long as it acted upon the principle of assisting only those schools which made use exclusively of the Society's publications, it tended to perpetuate the use of many books of little value, and kept better ones out of circulation. The establishment of the Bible Society was occasioned by the apathy of this Society relative to an issue of the scriptures in the Welsh language. The Society has latterly been stimulated into a more active course; and a standing sub-committee has been formed, which takes the management of publications relating to 'general literature and education.' The income of the Society is very large: its expenditure for the year ending November, 1835, amounted to 91,522*l.* 1*s.* 11*d.*; and for the same period it circulated 100,913 bibles, 86,061 testaments, and 192,082 prayer-books. The circulation of all its various publications amounted to 2,475,172.

CHRISTIANITY, that system of religion which has for its founder Jesus Christ.

The history of Christianity may be divided into three periods, of which the first embraces the life and ministry of Jesus Christ; the second comprehends the acts of the apostles after the death and resurrection of Christ, and the formation of the Christian church; the third period comprehends the history of the church from the termination of the labours of the apostles to the present day, and is a distinct subject from the history of the first two periods, so far as concerns the essential doctrines of Christianity.

The communities or churches founded by the apostles soon began to differ in various points of doctrine and discipline. From these differences arose a long series of violent disputes and animosities among the various religious parties or communities into which the whole body of Christians was divided. The frame of civil society also, in all the countries into which Christianity was gradually introduced, was necessarily affected by the new religion. Thus the history of the Christian church immediately subsequent to the cessation of the apostles' mission, and indeed we may say during the time of their mission, is inseparable from the history of all the several political societies among which Christianity was established. The history of Christianized Asia, Africa, and Europe, for several centuries, might with more propriety be called the history of the church in this or that country, than any thing else. The word church is here used in that proper and large sense which is pointed out at the end of the article CHURCH.

Viewing, however, the history of the church as a distinct subject, and paying no regard to the events of civil society, except so far as they are immediately and intimately connected with the church (the term here being used in a narrower sense), such a history is generally supposed to possess a sufficient unity of subject, as distinguished from civil history, to form a separate and distinct division of historical inquiry. Accordingly we have numerous histories of the church, whose professed object is to develop the progress of Christian doctrines, of the various opinions on matters of

faith and discipline which have divided Christians, and of the various communities or associations into which Christians have been distributed. But these histories, in all ages, being mainly written by the clergy, are often not so much histories of the church as of the clergy; not so much histories of the great body of Christians in this or that country, as of those whose immediate interests were often little identified with the interests of those whom it was their business to instruct. Such a contracted view of the history of Christianity, and of the history of the church in the several countries where Christianity is established, must always appear unsatisfactory to those who, considering the origin of the religion of Jesus Christ, its progress, and its development, as the great subject of the political drama of the civilized world for eighteen centuries, regard the history of *the* church or of *a* church not as in any respect dissociated from civil history, but as a component part of it. Intimately blended with all the relations of life, with all the great events of political society, and now for at least fourteen centuries directing or influencing all the functions of government, and by turns obstructing or retarding the progress of knowledge, according to the various forms in which it has been moulded for political purposes, a history of the church, distinct from the political history of the same nation and the same period, can have little value, except so far as it may be a good history of the clergy. Such a history of the church, however, has been often attempted by men neither deficient in industry nor learning; but the one-sided view which they have taken has never satisfied careful inquirers, and has only had the effect of forming in the minds of those who read much and think little, a certain confused notion of some essential difference between the history of the church and the history of those who, in various ages, have composed that church. On the other hand, writers of what is called history in the usual acceptation of the term, often seem to consider the history of the church as hardly lying within their sphere. It is true that those great events in the history of the church which have changed the face of society are not and cannot be overlooked by such writers; but the influence of the slow and incessant working of the great principle of Christianity, which is intimately blended with all the social systems of all the countries where Christianity is established, and by its all-pervading power penetrates to their remotest and minutest members, and enters into all the recesses of domestic life, is rarely glanced at, and seldom, if ever, duly estimated by writers of history. The history of civilization, which is the history of a continued progress, would appear to every reflecting person inseparable from the history of Christianity, or, in other words, of the church, taking this word in its large and proper sense. The public acts of the clergy as a body receive a place among other public events in our annals and our histories; but as the real history of a people is generally sunk in the history of their rulers, so that of the true church is merged in the history of the clergy.

A history, then, called a history of *the* church, in the sense in which we believe all writers of general church history have understood the term, appears to be a division of history which ought either to be entitled a History of the Clergy and of their Acts and Opinions, or it ought so to be blended with general civil history as to render a separate name unnecessary.

Instead of attempting a history of the church in any sense, which cannot be accomplished in a satisfactory way within the limits of any Cyclopædia, we have treated of the characteristic doctrines and discipline of the various bodies of Christians, whether properly called churches, or improperly so called, under their several heads. (See the Articles CHURCH; CATHOLIC CHURCH, &c.; and ATONEMENT, &c.)

Christianity is at present diffused over a large part of the world; but it can only be said to be established, either by the authority of the state, or by general consent, in the following countries. Christianity is established in all parts of Europe except the Ottoman dominions. In America, it is established in all those countries which are now under the dominion of descendants of Europeans, which are, in fact, the largest and best parts of the continent. In Africa, it exists in Abyssinia in a very corrupt state, and among the Copts of Egypt, who are now very inconsiderable in number. In Asia, the Christian religion is established in Armenia, but the number of Armenian Christians must not be estimated by the population of the country, for the merchants of this active and industrious people are found in many parts of Europe and Asia. In Syria, a branch of the Greek church still exists in the mountains of Libanus and the island of Cyprus; another in part of Syria and Diarbekr; and the Nestorians, who also belong to the Greek church, are found in Asiatic Turkey, about Mosul on the Tigris, in Persia, and also in some parts of India under the name of Christians of St. Thomas. In all the foreign dependencies of European powers, and especially those of the British empire, Christianity may be considered as established; though in many cases, as, for instance, in the British possessions in India, the number of Christians is very small, when compared with the natives. But the zealous and persevering labours of European and American missionaries are now diffusing a knowledge of Christianity, and with it, of the useful arts of life, over countries hardly accessible to commercial enterprise; and it may safely be predicted that by their efforts, and the spirit of colonization which distinguishes some of the European nations, Christianity will rapidly spread itself over a much larger part of the habitable globe. The two other religions which occupy so large a portion of the earth's surface, Mohammedanism and Buddhism, are limited as to the sphere within which they can extend their doctrines, and it seems unlikely that they will pass the limits within which they are now confined. But Christianity, being the religion of the most enterprising part of the human race, of those whose life consists in action more than in tranquillity and repose, is in a state of continual progress and diffusion; and it is probably to this difference between the temperament of most of the nations of Europe (a difference in some degree dependent on climate and local circumstances), and those of Asia and Africa, that Christianity still languishes among its comparatively few native professors in Asia and Africa, while the zeal and superior activity of the European race animate the missionaries of the United States and of England to preach the doctrines of Christianity in the very place of its birth, and to rival the old Catholic missionaries in zeal and courage. As the Apostles and the martyrs of the church testified the sincerity of their faith by their willingness to undergo every kind of suffering, and even death; so, in our own days, the apostles of Christianity, penetrating among the most uncivilized and savage tribes of the earth, have exhibited examples of a courage, perseverance, and self-devotion unparalleled in the history of man.

In Africa, Christianity has hitherto made the least progress: and indeed wherever the Mohammedans have settled in that country, it has gradually decayed or disappeared. The Christian churches of the south coasts of the Mediterranean, which were established at an early period in the history of the Church, no longer exist: those of Asia Minor have disappeared, and in Syria and Palestine, the cradle of Christianity, it still maintains a feeble and uncertain existence.

The great Christian churches are—

1. The Greek, or Eastern Church, divided into four principal branches.
2. The Latin, or Western, or Roman Catholic Church, which is single, and undivided.
3. The Protestant Church.

The Protestant cannot be called a Church in the sense in which the Catholic is called a Church, as it is not one undivided community, but consists of numerous independent communities. Still, as distinguished from the Catholic community, the whole body of Protestants is sometimes designated, though improperly, as the Protestant Church.

CHRISTIANSAND, THE PROVINCE OF, comprehends the most southern part of Norway, extending from Cape Lindesnaes (called by our seamen the Naze), or from 58° to a little north of 60° N. lat. It is comprised between the meridians of 5° and 10° E. long. Its length south and north is 140 miles, and its average breadth may be about 100 miles, which gives an area of 14,000 square miles. This computation does not differ much from the official statement, which gives to this province an area of 470 Swedish or 14,100 English square miles, or nearly twice the surface of Wales: its population amounts to 215,000 souls.

Cape Lindesnaes is considered as the southern extremity of the mountain-chain, which traverses Norway from south to north as far as 62° N. lat., and then turns E.N.E. till it joins the Kölen Range at 63° N. lat. This chain is named by modern geographers very properly the Norrska Fjellen, or Norway Range. It begins with Cape Lindesnaes, but does not attain the perpetual snow-line south of 59°; so that

those parts of it which are called Heck Field and Byglo do not rise 4000 feet above the sea, which in this parallel is the line of perpetual congelation. But north of 59°, the Iocle Field, Hougle Field, Guto Field, and Hardanger Field, rise somewhat above it. The highest summit of the Hougle Field is 4668 feet. The highest mountain, however, the Gousta-Fell, is not in the principal range, but east of it: the elevation of this mountain is 5535 feet above the sea. From these high mountain-masses, which occupy more than half its surface, the country slopes gradually towards the sea, forming everywhere a rocky, bold, and frequently a high shore, which on the east and south is slightly indented, but on the west forms a bay of considerable extent, the Bukke Fiord. Two of its branches run many miles into the mountains, and terminate at the foot of the high range. The northern and larger is called Närstrand Fiord, and the southern Lyse Fiord. The latter may be considered as separating the mountains from the hilly country which extends southward to Cape Lindesnaes.

The north-eastern part of Christiansand, about the Gousta Fell, is a very high country, called Tellemarken, and inhabited by a poor but hardy and enterprising race of men. The numerous clefts are filled with water, which rushes down in rapids and cataracts with incredible velocity. The waterfall of the Rinkan Foss is 450 feet high. These waters unite in three streams, which fall into the lake of Nord Soën, from which issues a powerful and rapid stream, the Skeen-Elf or Brevig-Elf. The southern districts of the province are mostly wide and fertile valleys, with a warmer climate than could be expected in such a high latitude. Agriculture is duly attended to, and the hills are covered with forests of oak, pine, fir, and birch. These forests are the principal wealth of the country, and supply materials for the building of the numerous boats employed in fishing, and are also an article of export in the shape of planks and deals. The fishery is not important, except that of lobsters, which are perhaps nowhere found in such immense numbers as along the southern coast between Hellesund (east of Christiansand), and Lister Fiord (north-west of Lindesnaes). The principal rivers are the Nid-Elf, which runs about 80 miles, and the Torridals-Elf, whose course is about 100 miles: both are too rapid to be navigated.

Besides the capital, Christiansand, there are the following places: Arendal, north-east of Christiansand, is built on piles, and its streets are formed partly by wooden bridges and partly by canals. Its harbour, which is safe but not large, is formed by the island of Trommoe. Deals and planks are exported, and in its neighbourhood some iron mines are worked. Vessels are also built. The population does not much exceed 2000 souls. Mandal, between Christiansand and Cape Lindesnaes, at the mouth of the Mandals-Elf, has a safe harbour, to which many vessels, when damaged in the dangerous navigation of this sea, resort. It exports salmon, both salt and dried, and has about 3000 inhabitants. Stavanger, on an arm of the Bukke Fiord, called the Tunge Fiord, has a spacious and safe harbour, and its inhabitants, who in 1825 amounted to 3777 souls, are actively employed in fishing and trading. Much earthenware is also made.

CHRISTIANSAND, a town of Norway, situated on the northern coast of the Skagerck, opposite the northern shores of the peninsula of Jutland, in 58° 10′ N. lat., and 8° 20′ E. long. It stands on an extensive bay, where the Torridals-Elf enters the sea: its harbour is safe, and affords a secure shelter for vessels that navigate the Baltic along this rocky coast. The town has long broad streets laid out with the utmost regularity, and covered in the middle with deep sand. The houses, though chiefly of wood, are very neat and pleasant, and separated from one another by gardens. The principal branch of industry is ship-building, this place being situated in the only district of Norway where oak grows, and hence most of the vessels belonging to the merchants of Christiania and Drammen are built here. It exports also logs and deals to England. On this coast lobsters are taken in great numbers, and this fishery extends round Cape Lindesnaes on the western coast of Norway as far as Cape Stadtland. Lobster fishing affords occupation to numbers of people, and the produce of their labour is sent to London. Christiansand is the capital of the province of the same name, and contained, in 1826, 7488 inhabitants.

CHRISTIANSTAD, a town in southern Sweden, in 56° 1′ N. lat., and 14° 5′ E. long. It is the capital of Christianstads Län, which comprehends the northern and eastern districts of the antient province of Scone or Skäne. The town is built on the river Helge An, which near it enlarges into a small lake, and is fortified. The streets are straight and wide, and the houses mostly built of wood. The harbour of the town is Ahus, a small place about 10 miles from it at the mouth of the river Helge An. The town was founded by Christian IV. of Denmark, towards the middle of the seventeenth century, when a canal was begun, to form a convenient water-communication with the harbour, but as its commerce was, and is still, very limited, this work has gone to decay. Some woollen and linen goods are made here, and good gloves. Population, 2900.

CHRISTIERN II., of Denmark, born in 1481, was the son of King John, and grandson of Christiern I. He ascended the throne on his father's death in 1513. In 1520 he succeeded in having himself elected king of Sweden, which country had been long distracted by civil factions. [MARGARET OF WALDEMAR.] Christiern took an atrocious, but, as he fancied it, an expeditious way of getting rid of all opposition for the future. Having assembled the chief nobles and prelates at Stockholm on the occasion of his coronation, he had them suddenly arrested and publicly executed. He also massacred a number of the citizens of Stockholm. (Puffendorf.) Gustavus Erickson, a descendant of the antient kings, who was a prisoner in Denmark, having contrived to escape, took refuge in the forests of Dalecarlia, where he roused the peasantry, attacked Christiern and his worthy satellite the archbishop of Upsa., defeated them, and drove the Danes from Sweden. [GUSTAVUS VASA.] Soon after Christiern was deposed by his own Danish subjects, who elected Frederick, duke of Holstein, in 1523. Christiern retired to Flanders, whence, after ten years, he set off with some Dutch troops, and made an attempt to recover his Danish dominions. He failed, and being taken prisoner, was put in prison, where he died in Jan., 1559. He has been called the Nero of the North.

CHRISTINA (of Sweden), the daughter of the great Gustavus Adolphus by Maria Eleonora, princess of Brandenburg, was born on the 8th of December, 1626. Her father bestowed great care on her education, and having no son to succeed him was anxious to cultivate in her a strong and masculine disposition. Even when a mere infant he expected that she, as the daughter of a warrior, should hear the roar of artillery without emotion. On his departure for the wars in Germany, Gustavus Adolphus appointed a regency, and, carrying his daughter in his arms, presented her to the assembled states of the kingdom as their future sovereign.

Gustavus fell at Lutzen in November, 1632. Christina, then six years of age, was proclaimed queen by the states, who left her in the hands of regents or guardians,—the five great dignitaries of the crown, who were charged with the administration of affairs and the task of completing the young queen's education. The Chancellor Oxenstiern, an experienced and enlightened statesman, was at the head of these dignitaries, and the other members of the regency were persons of ability and upright intentions. They, however, pursued the plan of education and discipline that had been traced out by the king himself, and to this we must, in part, attribute the singular character afterwards displayed by Christina.

From her earliest years she was surrounded by grave masters and scholars, who crowded and oppressed her intellect with Latin, Greek, Hebrew, history, and politics; and for her lighter amusements she was allowed to ride on horseback in masculine attire, to hunt, to shoot, and review troops. The society of her own sex was soon insupportable to her. It is generally stated, that she made considerable progress in several antient and modern languages, and in other branches of knowledge, and that at the council table she showed a searching wit and great precocity of reason. But her wit was almost always of that sort which is nearly allied to madness; her knowledge was not digested, and her mind wanted the equilibrium which is given by pure taste and sound judgment. Bayle says she read daily some pages of Tacitus in the original.

In 1644 she took the reins of government into her own hands, and, much favoured by circumstances, acted rather a conspicuous part in the affairs of Europe. She at once finished a war with Denmark, obtaining by treaty the cession of some territory to Sweden; she pressed on the peace with Germany against the advice of Oxenstiern and others;

and finally became a party to the treaty of Westphalia in 1648, by which, in consequence of the victories of her brave troops, she obtained several millions of dollars, three votes in the diet of the Germanic empire, and the cession of Pomerania, Wismar, Bremen, and Verden.

When pressed by the states to marry, she constantly and firmly refused. The assigned motives of her refusal have been preserved in several eccentric speeches which her majesty is said to have delivered without blushing. Among those who aspired to her hand was her own cousin Charles Gustavus, a prince of excellent qualities. In 1649 she was induced by the states to declare him her successor; but she would not allow the prince any share of her sovereign power, of which she was exceedingly jealous. Soon after the naming of her successor was over, she had herself crowned with great pomp, under the title of *King*.

Having now no wars to engage her attention, she gave herself up with all the energy of her character to arts and literature, or rather to a mania of patronizing artists and men of letters. Her court was soon crowded, good being mixed with the bad, the empty pretender with the real man of science, the sage with the buffoon. She attracted to Stockholm, Saumaise (Salmasius), Vossius, Bochart, Huet, Chevreau, Naudé, Meibom, and other foreigners, chiefly Frenchmen. To some of these she gave places and offices; others were mere retainers and hangers-on of the court. Descartes was her guest, but he died there soon after his arrival, his weak constitution, as it is said, being unable to resist the rigour of that northern climate.

Bourdelot, a gossiping intriguing French abbé, who pretended to some knowledge of medicine, and who was retained in quality of her physician, became the great favourite of the queen by flattering her vanity and ridiculing her court of philosophers and men of letters, whose jealousies and jarrings were incessant. This court was expensive and unpopular. Christina spent enormous sums, for so poor a country as Sweden, in the purchase of books, manuscripts, statues, pictures, antiquities, and curiosities. But reverence and affection for her father's memory stifled the murmurs of the Swedes, and when, to the astonishment of every body, she first spoke of abdicating, she was most earnestly entreated to remain on the throne. For some short time after this she showed a renewal of good sense and energy, and a disposition to public business. It was at this interval that Cromwell's ambassador, Whitlock, saw a good deal of her majesty, and that his secretary or follower, Morton, picked up that curious information about her court and herself which was afterwards published in England. (*Journal of an Embassy to Sweden in* 1653, 1654, *from the Commonwealth of England*, by Charles Morton.) Her distaste for what she called the splendid slavery of royalty, her desire to indulge in all her caprices in perfect liberty, and (a stronger motive perhaps than any other) her wish of presenting an extraordinary spectacle to the world, soon returning upon her, she formally signified her decided intention of renouncing the crown in May, 1654, and on the 16th of June her abdication took place with great solemnity, she being then only in the 28th year of her age.

Christina reserved to herself the revenues of some districts in Sweden and Germany, the entire independence of her person, and supreme authority, with the right of life and death over all such persons as should enter her service and form her suite. A few days after this public act she set off for Brussels, where she privately abjured the Protestant religion. A little later she publicly embraced Catholicism in the cathedral of Innspruck. People have doubted the sincerity of her conversion, and some of her witty sayings seem to evince no great reverence for the Roman church. From the Tyrol she travelled to Rome, where she made a sort of triumphal entrance, riding on horseback, dressed almost like a man. Here she surrounded herself with poets, painters, musicians, numismatists, and the like. Quarrelling however with some of the college of cardinals, she made a journey into France in 1656. At Paris she of course made a great sensation. Her constant companions were authors and academicians; for the society of her own sex she showed a greater contempt than ever, and the only French woman about whom she seemed to take any interest was Ninon L'Enclos. Her stay in Paris is said to have been shortened by Cardinal Mazarin, who, finding her inclined to engage in some intrigues against his authority, took such measures as rendered that capital an unpleasant residence for her. She, however, returned to France in the following year, and added to her notoriety by committing a murder in the royal palace of Fontainebleau, where apartments were allowed her. Monaldeschi, her master of the horse and chief favourite, who had been entrusted with all her secrets, was suddenly accused by her of a breach of confidence and high treason, and ordered to prepare for death. Lebel, a monk of the order of the Trinity, who was summoned to hear the offender's confession, implored for a pardon, or at least a suspension of so irregular a sentence, but Monaldeschi was forthwith put to death by Sentinelli, another Italian, and the captain of her body guard, in the *gallerie du cerf*, or stag-gallery. The court was offended, but took no public notice of this atrocious act, which Christina justified by stating that by her deed of abdication she had reserved to herself supreme power over her own suite—that she was still a queen wherever she went, and that Monaldeschi was guilty of high treason. Strange to say, she found defenders elsewhere; and among them was Leibnitz, who wrote an elaborate apology, or rather justification of the deed at Fontainebleau. French writers have pretty generally stated that Monaldeschi was only a traitor in love, and that he perished from a fit of jealousy; but there is no proof of any such connexion, which is in opposition to the whole tenor of Christina's life and conduct. The real nature of the offence is a mystery.

Finding herself avoided in France, the queen thought of visiting England, but the Protector Cromwell turned the dark side of his countenance towards her; she therefore did not land in England, but returned to Rome, where she presently involved herself in great pecuniary difficulties, and a quarrel with the pope (Alexander VII.). Upon the death of the king, her cousin, Charles Gustavus, in 1660, she travelled hastily from Rome to Stockholm, where, according to most accounts, she not only showed a regret at having abdicated, but a strong desire to re-ascend the throne. But the minds of the people were entirely alienated, and her change of religion was an insuperable barrier. She returned once more to Rome, which she never again left, except for one or two short intervals, during the remaining twenty-eight years of her life. Through that long period her occupations were various. She took part in several political intrigues; she is even said to have aspired to the elective crown of Poland; she interested herself for the Venetians in Candia, besieged by the Turks; she quarrelled anew with the pope and cardinals, who had liberally supplied her with money: she engaged actively in the Molinist or Quietist controversy; she indulged in the dreams of alchemy and judicial astrology; she violently censured Louis XIV. for his revocation of the Edict of Nantes and *dragonades* against the Protestants of France; she founded an *accademia*, or literary society; she corresponded with many *savans*, and she made a large collection of objects of art and antiquity. The ruling passion, which made her unhappy and ridiculous, was the ambition of influencing great political affairs when all power and influence had departed from her. She died at Rome with great composure on the 19th April, 1689, in the sixty-third year of her age. Though she wrote continually, not much of her writing has been preserved. Her 'Maxims and Sentences,' and 'Reflections on the Life and Actions of Alexander the Great,' were collected and published by Archenholtz, in his memoirs of her life, 4 vols., 4to., 1751. From the somewhat tediously minute work of Archenholtz, who was librarian to the landgrave of Hesse Cassel, and an honest pains-taking man, Lacombe derived the materials for his life of Christina, and D'Alembert his reflections and anecdotes of the same personage. Her 'Secret Letters' and 'Memoirs of her own Life, dedicated to God,' are forgeries. (See Archenholtz, as above; Catteau-Calville's *Histoire de Cristine, Reine de la Suède*; Fortia's *Travels in Sweden*; *Biographie Universelle*; the works of Bayle—her contemporary and correspondent; Voltaire; and Horace Walpole.)

CHRISTMAS, the festival in memory of Christ's Nativity, the day of which is observed on the 25th of December. St. Chrysostom informs us that in the primitive times Christmas and Epiphany were celebrated at one and the same feast (*Homil. in Diem Nativ. D. N. J. Christi*, Opera edit. Montfaucon, tom. iii. fol. Par. 1718, p. 354), probably from the belief that the rising of the star in the east and the birth of Christ were simultaneous. The separation took place at the Council of Nice, A.D. 325. The Armenians however continued to make but one feast of the two, as late as the thirteenth century.

The learned have long been divided upon the precise day of the Nativity. Some have fixed it at the Passover; others, among whom was archbishop Usher, at the feast of Tabernacles; and it has been observed, that if the shepherds were watching their flocks when it occurred in the field by night, it could hardly have happened in the depth of winter. Be this as it may, the 25th of December has been the day most generally fixed upon from the earliest ages of the church. Sir Isaac Newton, in his 'Commentary on the Prophecies of Daniel,' (Pt. i. c. ii. p. 144,) has a chapter 'Of the Times of the Birth and Passion of our Saviour,' in which he accounts for the choice of the 25th of December, the winter solstice, by showing that not only the feast of the Nativity, but most others, were originally fixed at cardinal points of the year; and that the first Christian calendars having been so arranged by mathematicians at pleasure, without any ground in tradition, the Christians afterwards took up with what they found in the calendars. So long as a fixed time of commemoration was solemnly appointed, they were content. The reader who would know more on this subject, may consult Baronii 'Apparatus ad Annales Ecclesiasticos,' fol. Lucæ, 1740, p. 475, et seq.; and a curious tract entitled, 'The Feast of Feasts; or, the Celebration of the Sacred Nativity of our blessed Lord and Saviour Jesus Christ; grounded upon the Scriptures, and confirmed by the practice of the Christian Church in all ages.' 4to. Oxf. 1644.

The season of the Nativity is no longer marked by that fervid hospitality which characterized its observance among our forefathers. At present Christmas meetings are chiefly confined to family parties. The wassail bowl, the yule-clog, and the lord of misrule, with a long train of sports and customs, which formerly prevailed at this season, are forgotten: even Christmas carols are nearly gone by: and the decking of churches, and of a few houses of people in humble life, with holly and other evergreens, forms now almost the only indication that this great festival is at hand. For the customs formerly prevalent, before, at, and about Christmas, see Brand's *Pop. Antiq.*, 4to edit., vol. i., pp. 350-415.

CHRISTMAS ROSE. [HELLEBORUS.]

CHRISTOPHE, HENRY, was born about 1767 or 1768. The place of his birth seems to be uncertain, for St. Christopher, St. Croix, St. Domingo, and Granada, are mentioned by different writers. He first attracted attention when a young man as a skilful cook at a tavern in Cape-Town, St. Domingo. In 1790, on the insurrection of the blacks in the French part of that island, he joined the insurgents, who paid great respect to his gigantic stature, energy, and courage. As the negroes succeeded he was promoted in military rank. Toussaint Louverture, the generalissimo of the blacks, employed him to put down an insurrection headed by Moise, or Moses, that general's own nephew. Christophe, by employing consummate artifice, got possession of Moses, who was put to death by his uncle, on which Christophe succeeded to his command in the northern province of French St. Domingo. He subsequently suppressed other revolts which troubled the dawn of negro freedom. In 1802, when General Leclerc, the brother-in-law of Napoleon Bonaparte, conducted a strong expedition from France to regain St. Domingo from the blacks, Christophe boldly defended Cape-Town; and when obliged to retreat, he burnt a great part of the town, and carried off 3000 men, with whom he joined Toussaint Louverture. When Toussaint was treacherously seized and transported to Europe, Christophe rallied with Dessalines, who then became commander-in-chief of the blacks. Through the effects of climate and a fierce desultory warfare, in which no one was more distinguished than Christophe, there was no longer any French force in the island by 1805. Dessalines then assumed supreme power in Hayti, and advanced Christophe. Not long afterwards Dessalines was accused of abuse of powers, and Christophe, joining with the mulatto Pethion, got up an insurrection, and murdered him in October, 1806. Christophe was then proclaimed generalissimo and president for life of the republic of Hayti, and he named his confederate Pethion his lieutenant and governor in the southern provinces. The negroes, imitating the republican proceedings of their old masters the French, had a national assembly of their own, which met at Cape-Town, and gave plausible grounds for Pethion, who was probably only jealous of his superior, to quarrel with Christophe. The mulatto general accused the president of a design against the liberties of the republic; the president called the general an anarchist and a revolted subject, and taking up arms drove him back to Port-au-Prince, where Pethion however maintained himself and what he called his republic for nearly eleven years.

In 1811 Christophe being undisputed master of the greater part of the country, had himself proclaimed king of Hayti, under the title of Henry I.; royalty, at the same time, being made hereditary in his family. Still following the fashions of Paris, he then organized a court and an hereditary nobility, creating black dukes, counts, barons, &c. On June 2, 1812, he was publicly crowned, and the ceremonies, all after the French pattern are said to have been very solemn and imposing. On the fall of Napoleon, the house of Bourbon entertained hopes of regaining their old colony, but they were frustrated by the power and skill of Christophe, who possessed several qualities that fitted him for government. On the death of Pethion, in 1818, he endeavoured to get possession of his state by force of arms, but he was beaten back with great loss by the republican blacks under their new president, General Boyer. These reverses, added to subsequent losses by fire, and other accidents, materially weakened him, at a moment when his tyranny and cruelty had rendered him generally unpopular at home, and the state of his health unfitted him for exertion. He was lying in bed from the consequences of an apoplectic stroke in Sans-Souci, a fine palace which he had built and fortified, when an insurrection burst around him, which had been aided by President Boyer. The insurgents had already proceeded to extreme measures, and the duke of Marmalade (a significant title), one of the first dignitaries of the kingdom, had proclaimed the abolition of monarchy. Seeing that nobles, generals, officers, and men, alike deserted him, to avoid being taken prisoner, Christophe shot himself through the heart on the 8th of October, 1820. His widow and children, with his favourite, General Noël, took refuge in Fort Henri, but the garrison presently surrendered, when his eldest son, Noël, and some inferior officers, were massacred.

During his reign, Christophe entertained some enlightened views. At one time he encouraged education, and the printing of books and newspapers. He even made a code of laws, which he called 'Code Henri', as Bonaparte had called his 'Code Napoléon.'

(*Amer. Cyc.*; *Biog. des Contem.*; Malo, *Hist. de Hayti.*)

CHRISTOPHER, DUKE of WURTEMBERG, was born in 1515. His early life was past in great troubles. In 1519-20 the confederated Suabian cities expelled his father Ulric from his dominions, and transferred the dukedom to the house of Austria. Christopher was carried to Vienna, where he narrowly escaped being made a prisoner by the Turks during their siege of that capital, under the great Solyman. In 1532 the Emperor Charles V. determined to confine him in a monastery in Spain, being more apprehensive of his talents than of those of his father the expelled duke, who was still living. When near to the Spanish frontier, Christopher escaped from his escort and fled to Bavaria, where his uncle, the reigning duke, and Philip the landgrave of Hesse, took up his own and his father's cause. The landgrave in particular made many efforts to recover for Duke Ulric his antient inheritance, but the Emperor Charles and his brother Ferdinand obstinately refused to relinquish so valuable a territory. Recourse was then had to arms. The French king, Francis I., secretly supplied large sums of money; and marching rapidly on Würtemberg, the landgrave in 1534 defeated the Austrians in the battle of Laufen, and restored Duke Ulric, who was well received by his people, and thenceforward placed under the safe protection of the great Protestant league of Schmalkalden. The recovery of Würtemberg was a great advantage on the side of the Protestants; but it was not until 1552, or two years after the death of Ulric and the accession of Christopher, that the Lutheran religion was fully established in that duchy. Finding, after a reign of two years, his authority was firmly established, Christopher proceeded to complete the work of the Reformation; and it is as a church reformer that he is honourably distinguished from the Protestant princes his contemporaries. He neither seized the church property for himself, nor distributed it among his nobles and courtiers: He appropriated it to the purposes of education, and to the support of the ministers of the new religion. A great fund was formed out of it and kept sacred, under the name of the 'Würtemberg church property;' the revenue derived from which sufficed to support what were called the Würtemberg cloister schools—destined for the education

of the clergy—the great theological seminary at Tübingen, and other establishments for the instruction of the people. Christopher also extended the liberties of his subjects, and gave them a code of laws. After a popular and beneficial reign of eighteen years, he died in December, 1568

CHRISTOPHER, HERB. [ACTÆA.]

CHRISTOPHER'S, ST., or ST. KITT'S, one of the Caribean islands, was discovered by Columbus in November, 1493, who was so delighted with its appearance that he gave it his own Christian name. At this time it was well peopled by the Caribbs, by whom it was called Liamuiga, or the Fertile Island. It was never colonized by the Spaniards, but was the first of all the British settlements in the West Indies. A party under Mr. Thomas Warner took possession of it in 1623, and four years afterwards it was shared with some French settlers. After various bloody contentions, the island was wholly ceded to the English, in whose possession it remained till 1782, when it was taken by the French, but restored at the peace of 1783. In 1805 it was again ravaged by the French, who however did not retain possession.

St. Kitt's contains about 44,000 acres, nearly one half of which is unfit for cultivation. The other part is almost entirely occupied with plantations of sugar-cane, leaving only a small portion for cotton, indigo, pasturage, and provisions. The centre of the island is occupied by rugged barren mountains, which contain some hot springs. The highest point, called Mount Misery, 3711 feet above the sea, is an exhausted volcano, the crater of which is still apparent. The soil of the plains is chiefly a dark grey loam.

The island is divided into nine parishes, and contains four towns - Basseterre, Sandy Point, Old Road, and Deep Bay. Basseterre is considered the capital. Its shores are protected by several small batteries. It sends ten members to the House of Assembly at Antigua, of which government it forms a part. The climate, though hot, is considered healthy, but the island is subject to violent hurricanes. It lies N.W. and S.E., 17 miles in length and 6 in breadth, and is separated from Nevis by a strait only a mile and a half wide.

CHROMATIC. [ACHROMATIC; OPTICS.]

CHROMATIC SCALE, in music, is the scale of semitones [SCALE]; and by *chromatic music* is commonly signified that kind of harmony in which extreme intervals are much used.

In the Greek music the *chromatic* (from χρῶμα, *colour*) was the second of the three *genera*, and, according to the opinion of some, was so denominated because the notes, or musical characters, in that genus were written in colours. Others think that the word was figuratively employed, and expressed a greater variety of shade, more of contrast, than the other *genera*. Having no data to judge from, it is impossible to say which of the two opinions is the correct one; and, in truth, the question may just as well remain in its present state.

CHROMIC ACID. [CHROMIUM.]

CHRO'MIS, a genus of fishes. [LABRIDÆ.]

CHROMIUM, a metal discovered by Vauquelin [VAUQUELIN], a distinguished French chemist, in the year 1797. He found it in a rare Siberian mineral, which contained lead, and called, from its colour, *red lead*, but which is now known as *chromate of lead*. Previous but very imperfect attempts had been made to determine the nature of this substance. Vauquelin proceeded in the following manner: he boiled 100 parts of the ore in a solution of 300 parts of bicarbonate of potash; after long ebullition it was found that 22 parts of the mineral were dissolved; the 78 remaining were boiled in diluted nitric acid, which dissolved 64 and left 14 parts; these, again treated with carbonate of potash, left only 2 parts, which, being red lead, were neglected. The nitric solution being evaporated yielded a crystallized nitrate of lead, which being converted into sulphate gave such a quantity of it as indicated 56·68 of metallic lead.

The alkaline liquors being mixed and evaporated, yellow crystals were procured; these, dissolved in water, and treated with dilute nitric acid, yielded, by spontaneous evaporation, crystals, which were the acid of the new metal, and to which Vauquelin gave the name of *chrome*, from its property of colouring the compounds into which it enters; and he concluded from his analysis that the Siberian red lead consisted of nearly

Chromic acid	34·88
Oxide of lead	65·12
	100

When this chromic acid, or, better, the oxide of chromium presently to be described, is mixed with charcoal in a crucible and very strongly heated, it is decomposed; this however is effected with difficulty on account of the great affinity of the metal for oxygen, and also of the high temperature requisite to fuse the metal; this is indeed so great that it cannot be obtained in a button or one mass, but is pulverulent, of a yellowish white colour, and metallic lustre. Its specific gravity is generally stated at 5·9, but according to Dr. Thomson it is but little above 5. The appearance of the metal varies however according to the circumstances under which it is reduced; thus Liebig obtained it as a black powder, by acting upon one of its chlorides with ammonia; from another chloride and ammoniacal gas it was obtained of a chocolate brown colour, and so finely divided that when heated in the air it burnt.

Chromium suffers but little change by exposure to the air; it conducts electricity. Acids act upon it but slightly, the nitric even dissolving it only after long ebullition; nor is the solution readily effected even when hydrochloric acid is added to the nitric so as to produce nascent chlorine: hydrofluoric acid when heated dissolves it, and hydrogen gas is evolved: heat acts but little upon this metal; even the flame of the blowpipe scarcely affects it.

Before describing the various compounds which this metal forms with different elementary bodies, or the nature of the more complex combinations of which it forms a part, it will be proper to describe the various ores which have been met with since its original discovery in the Siberian red lead, beginning however with a description of that substance.

Ores containing Chromium.

Chromate of Lead. Red Lead. Occurs massive and crystallized. Primary form of the crystal, an oblique rhombic prism. Colour, deep orange-red. Lustre, adamantine: sometimes translucent, rarely transparent. Specific gravity, 6. Hardness, 2·5, 3. Brittle; streak, orange-yellow. Cross-fracture, uneven, passing into conchoidal, with a splendent lustre. With the blowpipe, crackles and melts into a greyish slag. Soluble in nitric acid, solution yellow. Occurs in the gold mine of Berezof in Siberia, in the Ural, and Brazil.

When pure it is composed of

Chromic acid	31·71
Oxide of lead	68·29
	100

Massive varieties, amorphous; structure columnar, granular.

Subsesquichromate of Lead. Monochroite. Occurs massive and crystallized; form of the crystal imperfectly described. Colour, red. Lustre, resinous. Translucent on the edges. Specific gravity, 5·75, very soft. Powder, tile-red. Fuses by the blowpipe into a dark mass. Occurs with chromate of lead in the Ural. It is composed of

Chromic acid	23·31
Oxide of lead	76·69
	100

Chromate of Lead and Copper. Vauquelinite. Occurs massive, and in minute crystals. Primary form, an oblique rhombic prism. Colour, black or greenish-black. Lustre, adamantine, nearly opaque. Specific gravity, 5·5 to 5·78. Hardness, 2·5, 3. Streak, greenish. Fracture, uneven.

Before the blowpipe, fuses into a dark grey globule of metallic lustre, surrounded with beads of metallic lead.

The massive varieties are amorphous, botryoidal, reniform. Structure compact, fine granular.

Found with chromate of lead in Siberia.

Composed of, according to Berzelius,

Chromic acid	28·33
Oxide of lead	60·87
Oxide of copper . . .	10·8
	100

Chromate of iron. Chromiron—occurs massive and crystallized; crystal, the regular octahedron; colour, blackish; lustre, imperfect metallic; opaque; hardness, 5·5; brittle;

specific gravity, 4·321; streak, brown; fracture uneven, imperfect conchoidal; not attracted by the magnet; cleaves parallel to all its planes.

Analysis of the crystals from Baltimore, by Dr. Thomson:

Green oxide of chromium	52·95
Peroxide of iron	29·24
Alumina	12·22
White matter	3·09
Water	0·70
A trace of silica	
	98·20

The massive is amorphous, with a granular or compact structure; it is found in the island of Unst, in Scotland, and sometimes interspersed with green oxide: it occurs also in France and in North America, especially near Baltimore. Oxide of chromium has been observed in some aërolites.

We proceed now to the binary compounds of chromium, and first those which result from the combination of

Oxygen and Chromium.

1. *Chromic acid* may be prepared in several ways; one of the best is to dissolve bichromate of potash in water, and to pass through the hot solution hydrofluate of silica, which combines and forms a difficultly soluble salt with the potash, and the chromic acid remains in solution: this is to be evaporated to dryness in a platinum capsule, and the residue dissolved in a very small quantity of water: this solution, when further concentrated by evaporation, deposits red crystals of chromic acid, which are deliquescent, and very soluble in water. The solution is devoid of smell, but has a sour styptic taste; the solution is red or yellow, according to the degree of concentration: this acid is also very soluble in alcohol, and when the solution is heated it is decomposed, the results being oxide of chromium, formic acid, and æther. It acts upon and destroys vegetable colouring matter, and combines with bases to form salts, called chromates.

According to Berzelius, chromic acid is composed of

3 equivalents of oxygen		24
1 „ „	chromium	28
	Equivalent	52

2. *Oxide of chromium*, or rather *sesquioxide of chromium*, may be prepared in several modes, almost all of which are dependent upon the partial deoxidizement of chromic acid; thus when chromate of potash is mixed with its own weight of muriate of ammonia, and heated to redness, oxide of chromium is left, being formed by the deoxidizement of the acid by the hydrogen of the ammonia. Alcohol, sugar, sulphur, protonitrate of mercury, and oxalic acid, produce corresponding effects. The properties of this oxide are, that it has a green colour, it is insoluble in water, and unchanged by heat: the alkalis do not act upon it, but it is soluble in acids, forming salts with them. When combined with water so as to form a hydrate, it is of a bluish tint, and is then more readily dissolved by acids than after it has lost its water by a red heat.

It is the colouring matter of the emerald.

It is composed of

1½ equivalent of oxygen		12
1 „ „	chromium	28
		40

A brown oxide of chromium has been supposed to exist, but it is probably a mixture of the acid and green oxide.

Azote and *hydrogen* do not combine with chromium.

Chlorine and *chromium* combine in two proportions: the sesquichloride may be prepared by dissolving the sesquioxide in hydrochloric acid, and evaporating the solution to dryness at 212°; a green residue is obtained, which consists of the sesquichloride combined with water; when this is heated to about 400°; the water is expelled, and the pure sesquichloride remains of a reddish colour, when the operation is so conducted as to prevent the access of carbonic acid: when strongly heated in a close vessel it sublimes in scales of a peach blossom colour. This compound is readily soluble in water; the solution is green, and remarkable for the sweetness of its taste.

It is composed of

1½ equivalent of chlorine		54
„ „	chromium	28
		82

Terchloride of chromium is prepared by heating a mixture of chromate of potash, fused chloride of sodium, and sulphuric acid in a glass retort. By their mutual action a red vapour is evolved, which, passed into a cooled receiver, condenses into a fluid of a fine red colour. By water it is immediately decomposed, and yields a mixture of chromic and hydrochloric acids. It is composed of

3 equivalents of chlorine		108
1 „	chromium	28
		136

Fluorine and chromium form two compounds: the *Sesquifluoride* is procured by dissolving oxide of chromium in hydrofluoric acid; by their mutual decomposition and evaporation to dryness, water and the sesquifluoride are formed, and the latter remains as a green powder, which is soluble in water and composed of

1½ equivalent of fluorine		28·5
1 „	chromium	28
	Equivalent	56·5

Terfluoride of chromium is prepared by distilling a mixture of chromate of lead, fluor spar, and sulphuric acid in a leaden retort. A red coloured gas comes over, which acts rapidly on glass, and is decomposed by water, with the formation of chromic and hydrofluoric acids. It is composed of

3 equivalents of fluorine		57
1 „	chromium	28
	Equivalent	85

Bromine and chromium form two bromides, which are stated to be sesquibromides and terbromides. They are unimportant compounds.

The *non-metallic solids*, or at least several of them, combine with chromium; but this is not the case with carbon.

Sulphur and chromium may be made to combine, though not by direct action, in several different modes; the simplest is to heat the hydrate intimately mixed with sulphur in a close vessel; this sulphuret is of a dark grey colour, unctuous to the touch like plumbago, and when slightly heated in the air it burns like a pyrophorus, and is converted into oxide of chromium and sulphurous acid gas. It is not acted upon by nitric acid, but nascent chlorine dissolves it. It is a sesquisulphuret, composed of

1½ equivalent of sulphur		24
1 „	chromium	28
	Equivalent	52

Phosphorus and chromium form phosphuret of chromium. It is prepared by acting on the sesquichloride by phosphuretted hydrogen. It is black, insoluble in hydrochloric acid, and but slightly acted upon by nitric acid or nascent chlorine. It is composed of

1 equivalent of phosphorus		16
1 „	chromium	28
	Equivalent	44

The *salts of chromium* are next to be noticed. There is perhaps no metallic substance which so perfectly acts as an acid to bases and as a base to acids as this metal; the difference depending, of course, upon its degree of oxidizement, that is, whether it be an acid or an oxide. The compounds of the chromic acid and bases will first be mentioned, or the chromates.

Chromate of potash. This salt is used in large quantity, and is prepared by reducing chromiron to powder, mixing it with nitre, and subjecting the mixture to a high temperature in a crucible. The nitric acid of the nitre is decomposed, its oxygen acidifies the oxide of chromium of the chromiron, and this, uniting with the potash of the nitre, forms chromate of potash, which is washed out from the residue of peroxide of iron, and the solution is evaporated and crystallized.

The crystals of chromate of potash are yellow; the primary form is a right rhombic prism. It has a bitter disagreeable taste, is soluble in about twice its weight of water at 60°, and much more so in boiling water; it is insoluble in alcohol, and unalterable in the air; it turns turmeric paper reddish brown, but is a neutral salt, composed of

1 equivalent of chromic acid	.	52
1 „ potash	.	48
		100

Bichromate of potash may be prepared by adding chromic acid to a solution of the chromate, but it is more economically obtained by adding nitric acid. By evaporation crystals of bichromate are obtained; the primary form is a doubly oblique prism, and they are frequently large. Bichromate of potash has a penetrating, bitter, metallic taste; and is not alterable by exposure either to air or moderate heat. It is soluble in about ten times its weight of water at 60°, and more so in boiling water: the solution reddens litmus paper. When heated to whiteness, half of its acid is decomposed into oxide of chromium of a very fine colour, mixed with chromate. It is decomposed, as already noticed, by various deoxidizing bodies, such as alcohol, sugar, &c. It is composed of

2 equivalents of chromic acid	.	104
1 „ potash . .	.	48
Equivalent	. .	152

It contains no water.

Chromate of soda and bichromate of soda are salts analogous to those of potash just described. The former is yellow, and so very soluble that the least increase of temperature causes it to fuse in its water of crystallization. The bichromate is red.

Chromate of lime is soluble in water, and crystallizes in silky plates.

Chromate of magnesia. The neutral chromate is yellow; it is very soluble, and crystallizes in prisms. The bichromate is red.

Chromate of barytes. It is prepared by the double decomposition of chromate of potash and nitrate of barytes. It is of a yellow colour, insoluble in water. It is decomposed by sulphuric acid, which throws down the barytes in the state of sulphate, and a compound of sulphuric and chromic acids remains in solution. Hydrochloric acid converts it into chlorides of chromium and barium. It is composed of

1 equivalent of chromic acid	.	52
1 „ barytes . .	.	76
Equivalent	. .	128

Chromate of chromium. This compound is obtained by dissolving hydrate of chromium in chromic acid; the solution is of a brown colour; by evaporation a solid uncrystallized mass is obtained, which attracts moisture from the air, and dissolves readily in water and in alcohol. It is a bichromate, composed of

2 equivalents of chromic acid . . .	.	104
1 „ sesquioxide of chromium	.	40
Equivalent . . .	.	144

Bichromate of iron is prepared by saturating the acid with perhydrate of iron. The solution is decomposed by water, which precipitates peroxide of iron, and holds the chromic acid in solution. It appears to be a bichromate, composed of

2 equivalents of chromic acid	. .	104
1 „ peroxide of iron	.	40
Equivalent . .	.	144

Chromate of manganese is obtained by dissolving the carbonate of manganese in chromic acid. The solution is brown, and has a sharp metallic taste. It is decomposed by evaporation, and yields no crystals.

The above described metallic chromates are unimportant, but the chromate of lead is a compound, which is extensively employed as a pigment and in calico printing.

As a pigment it is prepared by the double decomposition of chromate of potash and nitrate of lead. The precipitate is of a fine yellow colour, totally insoluble in water, but dissolved by nitric acid; and it mixes well with oil. It is composed of

1 equivalent of chromic acid	.	52
1 „ oxide of lead	.	112
Equivalent		164

It is also used in calico printing.

Dichromate of lead is prepared by digesting the chromate in solution of potash; this removes half the chromic acid, and the remaining salt is of a fine scarlet colour, insoluble in water; when heated it becomes brick red, but its scarlet colour returns as it cools; by the addition of nitric acid it is reconverted to neutral yellow chromate. It consists of

1 equivalent of chromic acid	.	52
2 „ oxide of lead	.	224
Equivalent	. .	276

These are the most important chromates; the salts which contain oxide of chromine as a base are not at all employed: we shall mention only the most distinctly marked of them.

Nitrate of chromium. Oxide of chromium dissolves readily in nitric acid; it is however difficult to saturate it. The solution when evaporated to dryness leaves a reddish substance, which dissolves easily in water. It does not appear to yield crystals, nor has its composition been ascertained; it is however probably a neutral nitrate.

Sulphate of chromium is prepared by dissolving the hydrate in dilute sulphuric acid; the solution is of a dark green colour, and has a sweetish taste. By evaporation to dryness a dark-coloured tasteless matter remains, which is not altered by exposure to the air, and does not readily dissolve in water. It is probably a neutral sulphate.

The arseniate, carbonate, and phosphate of chromium are all insoluble compounds, which are not at all employed, nor indeed is any salt of oxide of chromium; but, as already noticed, the chromates of potash and lead are largely used, and oxide of chromium is employed to give a green colour to glass and to porcelain.

CHRONICLE, CHRO'NICON (from χρόνος, time), denotes a history in which facts are digested in order of time, though not necessarily in successive years, as is distinctly implied in the word Annals. It must be owned however that the two terms have been indiscriminately used for histories in which the succession of years has been the governing principle of the narrative. The term Chronicle, at the present day, is seldom used but in speaking of our old histories, as the 'Saxon Chronicle;' 'Caxton's Chronicle;' 'Fabyan's Chronicle;' 'Holinshed's Chronicle;' &c. This term was also adopted by the French, as in 'Les Chroniques de France (appellee la Chronique de St. Denys), compilés par l'ordre du Roy Charles VIII.,' 3 tom., fol. Par. 1476 [ANNALS.]

CHRONICLES, the name of two books of the Old Testament. In the original Hebrew they constitute only one book, entitled דִּבְרֵי הַיָּמִים (Debri Haimim) *Verba Dierum*, Words of Days; that is, diaries or journals. In the Septuagint they are called *Παραλειπόμενα, res prætermissæ*, 'things omitted.' The Books of Chronicles have been so called from being considered as supplementary to the Books of Samuel and of Kings: the histories of which they repeat with considerable variations. Some commentators and critics state decidedly that the compiler is unknown. (Vatablus, Hoffmann.) The name Chronicles seems to have been first applied by St. Hieronymus (Jerome), who is followed by Du Pin, Bishop Patrick, and most modern commentators, in supposing that Ezra, otherwise Esdras, was the compiler of these books, about twenty-six years after he compiled the Books of Kings, and eighteen after the return of the Jews from the seventy years' captivity in Babylon. (Dr. Allix, *Reflex. on Old Test.*, vol. ii., c. 1.) Eichhorn enumerates several reasons for attributing them to Ezra (*Einleitung*, vol. ii., pp. 579—601), the chief of which is, a similarity to the Books of Kings and Ezra in style, orthography, and idiom. The Jews also ascribe them to Ezra. There are however several considerations which diminish the probability of their being his work (Calmet's *Dict.*, by Taylor), one of which is, that (*Chron.* iii. 19, et seq.) an account is given of the posterity of his contemporary Zerubbabel, which extends several generations beyond the time of Ezra, who is supposed to have died at the age of 120, a year or two after compiling the Chronicles (Ezra, in Taylor's Calmet); but nothing, as Eichhorn observes, is certainly known of the time either of his birth or his death. The apparent improbability that the histories of the Books of Kings should be re-written by the same person with such numerous discrepancies and contradictions as are found between Kings and Chronicles, is

thus explained by the commentators: they state that Ezra, on his return to Judæa, discovered more and better materials than he possessed when he compiled the Books of Kings at Babylon, and therefore the Chronicles are to be regarded as *addenda* and *corrigenda*. Some however of the variations are not improvements: for example, in the history of Jehoram (2 Chron. xxi.), which is repeated verbatim from 2 Kings viii. 17, &c., this king is said (v. 5 and 20) to have died at the age of 40, as related in Kings; but the probable statement in Kings (v. 26) that his son Ahaziah's age, on succeeding him, was 22, is altered in Chronicles to 42 (ch. xxii. 2), making the son two years older than the father. It stands thus in the authorized version, but in some antient MSS. of Chronicles it is written 22. The numerous contradictions throughout Chronicles and Kings, in facts, dates, numbers, names, and genealogies, are acknowledged by many learned critics. They form the subject matter of nearly the whole of Dr. Kennicott's First Dissertation on the State of the Hebrew Text; where they are treated as corruptions, interpolations, and mistakes. In the narrative 1 Chron. xviii. 3, which is taken verbatim from 2 Sam. viii. 3, there occurs, besides a variation of proper names, an alteration of 700 horsemen to 7000: and exactly 'the same mistake' (Kennicott) occurs in the passage cited in 1 Chron. xix. 18, from 2 Sam. x. 8. Compare also the numbers in 1 Kings iv. 26, with 2 Chron. ix. 25; and 1 Kings ix. 23, with 2 Chron. viii. 18. Many passages and chapters in Chronicles and Kings appear to have been transcribed verbatim from records made before the Babylonian captivity, while the Temple was standing: as 2 Chron. v.; and 1 Kings viii., which are word for word alike, and speak of the ark, the former in v. 9; the latter in v. 8, as being in the Holy Place 'unto this day:' though neither Kings nor Chronicles are supposed to have been written until from sixty to ninety years after the Temple, and all its contents had been demolished, or carried off by Nebuchadnezzar. Another instance is in 2 Chron. viii. 8. In fact, the compiler or abridger appears to have had before him a collection of various antient memoirs, genealogies, annals, registers, &c., from which he quoted indiscriminately 'without taking the trouble to reconcile inconsistencies.' (Rees's *Cyclopædia; Theolog. Dict.*, by J. Robinson, D.D.) The last thirteen verses of 1 Chron. ch. i., occur verbatim in Genesis, ch. xxxvi., and appear to have been transcribed from some historical document made after Saul, the first king, reigned in Israel (see v. 31), which was 400 years after the death of Moses. Another curious particular is that the two last verses of 2 Chron. concerning the proclamation of Cyrus, are the same which begin the following Books of Ezra. In Rees's *Cyclopædia*, this fact is accounted for in the following words:—'Some transcriber having finished Chronicles at v. 21, proceeded, without leaving the usual space, to write the Book of Ezra; but finding his mistake he broke off abruptly, and began Ezra at the usual distance, without indicating his error by erasing the passages which he had carelessly subjoined to Chronicles.' The broken sentence with which Chronicles end at 'go up,' is completed in v. 3 of Ezra 'to Jerusalem,' &c. Grotius, in his Comment. on Chron. says, 'Is mos libros continuandi est antiquus, quem et Procopius sequitur fine Vandalicorum et Gothicorum initio.' (*Opera Omnia*, tom. i., p. 189.)

To this suggestion may be added a fact not noticed by the commentators, that the Jews, in the public reading of their scriptures, to avoid ending with the recital of any calamity producing dejection, add the commencement of the next paragraph, or repeat a portion of that which precedes, in order to finish with something consolatory. Accordingly, in Hebrew copies, at the end especially of Isaiah, Malachi, Lamentations, and Ecclesiastes, a masoretic sign is given, formed of the initials of these four books (יתקק) to indicate the recital of some antecedent or subsequent passage. It is supposed by St. Hieronymus that the present books of Chronicles are those of the kings of Judah and of Israel, so often referred to in the books of Kings. The objection to this supposition is, that these references are not unfrequently made to what is not to be found in the present book of Chronicles. The Chronicles referred to in Kings are generally thought to have been a voluminous work from which ours are only a brief and mutilated abstract. Grotius, Capellus, Spinosa, Clericus, R. Simonius, Whiston, and others, hold this opinion. Carpzof, in his 'Introduc. ad Vet. Testament,' rejects it as 'very absurd.' The chief design of this compilation seems to have been to exhibit, first, the genealogies, ranks, and functions of the priesthood, in order that, after returning from the captivity, they might re-assume their proper dignities: and secondly, by describing the distribution of lands before the Captivity, to direct the families of each tribe in regaining their antient inheritances. The first book is a recapitulation of sacred history from the creation to the death of David. The second book gives the history of the kings of Israel and Judah from Solomon, to the return from Babylon. Jerome attaches a great importance to the study of these books his words are, 'The book of things omitted (the book of Chronicles), i. e., an epitome of the Old Testament, is of such great importance, that if a man lay claim to a knowledge of scripture without knowing this book, he is only deceiving himself; for every single name, and every juxtaposition of words, both refer to innumerable things omitted in the Books of Kings, and explain innumerable difficulties in the Gospel' (Hieronymi *Opera*, 1734, tom. i., p. 277); and in his preface 'ad Lib. Paralip.,' he says, 'This work contains all the learning of the Scriptures.' The same father enjoins a young friend (*Epist. 7 ad Leta.*), to learn by heart the whole of the two Books of Chronicles, together with the Pentateuch, Prophets, Kings, Esdras, Esther, and Solomon's Song. The authority of the books of Chronicles is established by St. Paul's applying a prophetic passage (Heb. i. 5) to the character of our Saviour from 1 Chron. xvii. 13 and 14; see also chap. xxii. 10.' (Bishop Mant's *Bible.*) For the purpose of comparison and critical investigation, see the table of Chronicles, Samuel, and Kings, in Horne's 'Introduction to the Bible,' vol. iv., p. 58, and vol. ii., p. 37: also Cruttwell's 'Concordance of Parallels,' p. 147. A notice of the Commentators on the books of Chronicles—Hieronymus, Procopius, Bede, Crommius, Lavater, Leonhartus, Sanctius, Serarius, Strigelius, Jackson, &c., may be found in Jo. Gotlobb. Carpzovii 'Introduc. ad libros Canonicos,' 4to., 1731, tom. i., pp. 279–303, and tom. ii., pp. 466–487: in William Crowe's 'Catalogue of Commentators,' 12mo., 1668, pp. 46–49, and in Hoffmanni 'Lexicon.' See also 'Poli Synopsis Criticorum,' fol., vol. i., p. 714, et seq.; Bishop Patrick's 'Comment.,' vol. ii., p. 529; Du Pin 'Compleat Hist. of the Canon.,' fol., p. 84. Eichhorn, 'Einleitung in das Alte Testament,' ubi supra; Kennicott's 'Dissertation,' and 'Reply' to it, by Julius Bates, pp. 104—185; and the Abbé Richard's critical treatise on the apparent contradictions of Chronicles and Kings.

CHRONOLOGY (χρονολογία), a Greek word, literally signifying 'time-reckoning.' In contradistinction to history, which connects events according to the manner in which each is produced or occasioned by another, chronology regards events simply according to the order of time. It is evident however that the succession of events in the order of time makes a very important part of their exposition in the relation of cause and effect; for whatever else there may be in the bond which unites what we call a cause and its effect, the circumstance that the cause precedes the effect in the order of time is always present. A history therefore cannot be written even in the loosest manner, nor an intelligible narrative put together, without chronology being so far attended to that the events shall be related in the order in which they happened. Even what is called the epic method of taking up the story in the thick of the interest, rather than from the beginning of the series of events out of which the interest grows, is no exception. In whatever mode it may be thought best for the effect intended to be produced that the several portions of the story should be arranged and exhibited, each portion must in itself be detailed chronologically, else it will be incomprehensible. And even in an epic poem an order of time is always strictly observed throughout, though the poet may select a different series of events through which to take his course from that which would be adopted by the historian. In the Æneid, for example, it is true that the events of the shipwreck of Æneas and his followers, and their reception by Queen Dido, which are related in the first book of the poem, happened subsequently to the destruction of Troy, and their adventures in the course of their navigation to Carthage, which pass before the reader in the second and third books; but these last mentioned events are really not what the poet professes to relate in these two books. What they profess to contain is the discourse addressed by Æneas

to Dido, at the banquet in her palace; and the delivery of this discourse happened not before but after the events related in the first book of the poem.

The order of a history, however, will often differ from that of a purely chronological arrangement in this respect. In the former each connected series of events is related separately, and thus forms a unity, in which the progress and development of certain principles, causes, or given conditions of society are exhibited. In the latter, events of various naturally distinct series are necessarily intermixed, nothing being attended to except the order of time in which they happened. Thus a mere chronological table, or chronicle, of the events of the last century would enumerate, under no arrangement except the order of time, the events which had taken place during that period in all the countries of the world, and in all the departments of human action, and also it might be of inanimate nature; if the scheme were comprehensive enough, the notice of an inundation of the ocean, or an eruption of Vesuvius, might break in upon the detail of a succession of scientific discoveries, or the incidents of a political revolution. History, in the pursuit of its proper business of tracing each effect to its cause, necessarily avoids this intermixture. It first follows one chain of events, at least up to a certain point at which a pause may conveniently be made, and then it takes up another chain. Still each chain is continued in the chronological order of its links. Every long history, indeed, must in this way be properly a collection of many short histories; and these latter will be numerous in proportion to the extent and complexity of the subject. Neither a history nor a chronicle need embrace all the recorded or remarkable events of the period over which it professes to extend; the one as well as the other may be confined to events or transactions of any particular kind, as well as of any particular period. But whatever variety of matters may be comprehended in a history, it is at the option of the historian, and belongs to his art, to dispose them into as many distinct narratives, or portions of a narrative, as may appear best suited for their clear and effective exposition; whereas all the facts, however various, which a chronicle or chronological table may comprehend, must be related in one narrative or series. Though an intermixture of all kinds of events with those that more peculiarly belong to chronology, which are the events of political society, is not unusual in tables of chronology, the events of any one branch of human action or speculation, or, as already observed, the phenomena of nature, might often with more propriety be exhibited in separate chronological tables.

It has sometimes been attempted to combine in a chronological table, with its own peculiar advantages, something of this distinctness or separation of one subject from another which is found in a history, by employing a particular form of type or other appropriated mark for each series of connected events. This method was first employed, as far as we know, and indeed it is there claimed as new, in a short general chronological table at the end of the work entitled 'Elements of General History,' by Alexander Fraser Tytler (afterwards Lord Woodhouselee), 2 vols., 8vo., Edinburgh, 1801. In this table the series of the kings and emperors of Rome is printed in a larger Roman type than the rest of the table, that of the emperors of Germany in Italic capitals, that of the kings of England in the old English letter, that of the kings of France in small Italics, &c. 'By this method,' to quote the explanation of the compiler, 'the succession of the sovereigns in the different kingdoms is immediately distinguishable to the eye, as well as the duration of their reigns, while the intervening space is filled by the remarkable events that occurred at that period all over the world; and thus the connexion of general history is preserved unbroken.'

Some histories are written in a more, some in a less strict chronological order. It is observed by Dionysius of Halicarnassus, in a comparison between Herodotus and Thucydides, that Thucydides has followed the order of time, Herodotus that of things, and that on this account Thucydides is obscure and difficult to understand. While Thucydides, he says, has divided his single subject into many parts, Herodotus, having in his history embraced many different subjects, has formed them into a single whole, of which the several parts perfectly correspond. But though the method of Herodotus may be the best adapted for conveying a clear view of each particular portion of history of which he has treated, every series of naturally connected events forming a narrative or story by itself, it is not easy to gather from his work any notion of the synchronism of events, or of the relation of those of one series to those of another in point of time. Larcher, in the preface to his French translation of Herodotus (edition of 1802), has noticed that Photius has complained of the confusion occasioned by the digressions of this author, and that other critics have been disposed to deny that he followed any regular or intelligible plan. Larcher however dissents from this judgment, and explains what he conceives to have been the plan of Herodotus (*Preface*, pp. xxv.—xxxii.). He has also printed, with annotations, in his sixth volume, three memoirs by the Abbé Geinoz, in vindication of Herodotus against the attacks of Plutarch; and of these the third (pp. 601—627) is an exposition of the method and plan of the historian. His history is of the form of an epic poem, of which the main subject is the wars of the Greeks and Persians. The digressions, which correspond to the episodes of an epic poem, and, as in the case of that on Egypt, take up an entire book, render it very difficult for a young student to form an idea of the history as a whole. But if the episodes are cut out, the whole history exhibits the main subject in a regular progress and order. The chronological system of Herodotus has been amply illustrated by Larcher in his 'Essai de Chronologie sur Hérodote,' printed in the sixth volume of his first edition (1786), and, greatly altered and enlarged, in the seventh volume of his second edition.

But although both Herodotus and Thucydides have, each after his own method, so far adhered to a chronological arrangement as to relate the events in the order of time in which they happened, neither of these writers has throughout his narrative attended to chronology in any scientific sense. They were both prevented from doing this by the want, in that early age, of any fixed epoch or starting point from which to reckon. It has been well observed, that 'the best simile for dates is to say, that they are to history what the latitude and longitude are to navigation—fixing the exact position of, and serving as unerring guides to, the object to which they are applied.' (Nicolas's *Chronology of History, Preface*, p. vi.) In this view the histories of Herodotus and Thucydides may be compared to charts or maps drawn without the aid of parallels of latitude or meridian lines, in which indeed the situations of cities and mountains, the courses of rivers, and the general form of countries and outline of coasts might be represented with a certain degree of correctness, but not with the precision requisite for any scientific purpose. Thucydides, however, in recording the events of the Peloponnesian war, keeps to the order of the years; and he fixes the date of the commencement of the war (ii. 2), by referring to the truce made after the capture of Eubœa, to the priesthood of Chrysis in Argos, to the ephorship of Ainesias at Sparta, and the archonship of Pythodorus at Athens. In speaking of events that happened long before the war (i. 13, 19), he refers to the end of the Peloponnesian war as the point from which to reckon backwards.

The determination of the length of the year and the regulation of the calendar appear to have occupied the attention of the antients before they ever thought of dating events from a fixed epoch. But the latter object was of interest only to historical inquirers; the former matters were naturally in the hands of the cultivators of astronomy, who were the best qualified for their management, and were besides more immediately interesting and important to the whole community. There is a curious passage in the 'Clouds' of Aristophanes, in which the clouds, addressing the people of Athens, report a complaint made by the moon about the displeasure she had incurred from the gods in consequence of the confusion into which their festival days had fallen; the allusion, it has been supposed, being to Meton's reformation of the calendar, which had recently been introduced. (*Clouds*, 603, &c.) Aristophanes was a contemporary of Thucydides.

The first æra, or computation of time from an epoch, made use of among the Greeks was that of the Olympiads. 'Hail, venerable Olympiads, ye guardians of time, ye vindicators of the truth of history, ye bridlers in of the fanatical licence of chronologists!' exclaims Joseph Scaliger in his Animadversions on Eusebius, in a paroxysm of chronological enthusiasm. The date of the original institution of the Olympic games is placed in very remote antiquity; but it was a long time even after their revival by king Iphitus (B.C. 884) before they came to be used for the purpose of

fixing historical events. The following paragraph is from the introduction to Playfair's Chronology, with the exception of the dates within brackets: 'Hellanicus (B.C. 496—411) regulated his narration by the succession of the priestesses of Juno at Argos. Ephorus (B.C. 300) digested things by generations. The Arundelian marbles (B.C. 263) make no mention of olympiads, and reckon backwards from the time then present by years. In the histories of Herodotus (B.C. 484—413) and Thucydides (B.C. 471—391) the dates of events are not ascertained by any fixed epochs. The olympiads were not commonly applied to this purpose in so early a period. Timæus of Sicily, who flourished in the reign of Ptolemy Philadelphus (B.C. 283—245), was the first who attempted to establish an æra, by comparing and correcting the dates of the olympiads, the Spartan kings, the archons of Athens, and the priestesses of Juno. Eratosthenes (B.C. 194), the father of chronology, and Apollodorus (B.C. 115) digested the events recorded by them, according to the olympiads and the succession of Spartan kings.' When the olympiads were adopted as an æra, the reckoning was made to commence from the games at which Corœbus was the victor, being the first at which the name of the victor was recorded. The olympiad of Corœbus accordingly is considered in chronology as the first olympiad. Its date is placed 108 years after the restoration of the games by Iphitus, and is calculated to correspond with the year B.C. 776.

The statement we have just quoted from Playfair is given at greater length, and with references to the authorities, in the first chapter of Sir Isaac Newton's Chronology. Of the names that have been mentioned, only Eratosthenes and Apollodorus can be considered as having been systematizing chronologers, or as having employed themselves on the science of chronology. The merits of Timæus appear to have consisted in his endeavouring to ascertain with greater precision than any preceding historian the dates of the events of which he treated in his histories of Sicily, of the wars of Pyrrhus, &c. An account of his works is given in Clinton's 'Fasti Hellenici,' iii., 489—491. The fragments of Timæus have been collected by Goeller, in his work, 'De Situ et Origine Syracusanorum,' 8vo., Leipzig: 1818. Eratosthenes, the eminent astronomer, seems to have endeavoured to establish what may be called a system of chronology by ascertaining the dates of certain antient events, which might serve as fixed points from which to reckon all other events. We have no account however of the process by which he arrived at his conclusions. The fragments of his chronological as well as of his other writings, with the passages of the antient authors in which each is mentioned, and notes, have been published by Gottfr. Bernhardy in a small volume, entitled 'Eratosthenica,' 8vo., Berolini, 1822. The dates which he affixed to the principal events of antiquity are given from Clemens Alexandrinus, in Clinton, i., 124. Those of Apollodorus, who made some corrections on the system of Eratosthenes, are given in Clinton, i., 125, as preserved by Eusebius on the authority of Porphyry. Clinton has shown that the leading dates of Eratosthenes and Apollodorus were adopted generally by subsequent chronologers, both Greek and Latin. Among the Romans the most eminent authority in chronology was Varro, who flourished in the century immediately preceding our æra, but of whose numerous and learned works very little remains. Belonging to a much later age, the third century of our æra, there has been preserved the work of Censorinus, entitled 'De Die Natali,' which is in the greater part a treatise on dates, epochs, and other matters appertaining to the science of chronology. There is a passage in the twenty-first chapter of Censorinus, containing a memorandum of the distance of the year in which he wrote (A.D. 238) from the first olympiad, from the building of Rome, from the reformation of the calendar by Julius Cæsar, and from other epochs, which has been thought so important to chronology, that Petau has attributed its preservation to the special goodness of Providence.

The establishment of the first olympiad as a common epoch may be said to have given birth to chronology as a science, by introducing into historical writing the general practice of dating events with reference either to that or to some other fixed point. The principal business of chronologers after this was to determine the relationship of each of these epochs to every other.

The common æra of the Roman historians commences from the foundation of the city of Rome. But there was a great variety of opinion among the antients, as there has continued to be among the moderns, respecting the true date of this event. The Romans themselves for the most part followed either the computation of Cato, which places it in B.C. 752, or that of Varro, which assigns it to B.C. 753. Some writers, among others Livy, appear to reckon sometimes by the one, sometimes by the other: most modern chronologers follow that of Varro. This practice of dating events from the building of Rome may be regarded as the first adoption of the simple method of reckoning from a fixed point by single years, and as forming therefore one of the great stages of chronology.

Another usual mode of reckoning among the Latin historians was by the annual consulships. Often both the year of the city and the names of the consuls are given.

The method of reckoning from the first olympiad was occasionally employed long after the birth of Christ. 'Some writers,' says Playfair, 'have continued the use of the olympiads to the 312th year of the Christian era. Cedrenus (a Greek monk of the eleventh century) has brought them 80 years lower, making the 393rd year of our Lord the last olympian year.' Sir Harris Nicolas (*Chronology of History*, p. 2) speaks of the computation by olympiads having ceased after the 364th olympiad, in the year of Christ 440. Particular writers may have reckoned by olympiads down to that date, as they might down to the present day; but it had certainly long before ceased to be the common practice to do so. From A.D. 312 the regular public mode of computation throughout the Roman empire, both west and east, was by the indictions, which were cycles or periods of fifteen years, beginning with that year. [INDICTION.] The practice of dating events by indictions was at one time followed in most of the kingdoms of modern Europe, and in France was not altogether discontinued till the end of the fifteenth century. The method of dating events from the birth of Christ is said to have been first practised by a Roman monk named Dionysius the Little about the year 527. It came into general use in Italy before the termination of that century, but in France not until the eighth century, in Spain not until the fourteenth, and in Portugal not till after the commencement of the fifteenth. The method of reckoning from this epoch, being now universally adopted throughout Christendom, and being the only computation generally used both in historical accounts of past events and in dating current time, has furnished a chronological measure of much more extensive application than any other which had preceded it. It is generally held that the birth of Christ actually took place about four years earlier than the date assigned to the event by Dionysius; but this mistake of the inventor of the vulgar æra does not affect its value as a scheme of chronological notation. It is quite unimportant which the point is from which we reckon, if it be a determinate point.

There is one inconvenience however attending the choice of an event for reckoning from so recent as the birth of Christ, namely, that it necessarily introduces two modes of reckoning, and leaves the events of a large, in fact of the largest, portion of history to be as it were dated backwards, or according to the distance of each behind the assumed epoch. Even the æra of the olympiads was not free from this objection; for although, as we learn from Censorinus, Varro considered the historical age to commence only with the first olympiad, the traditions even of the Greeks ascended to fully four hundred years beyond that date. The histories and traditions of the Hebrews, and other antient nations, extend much farther back. To provide a more comprehensive mode of reckoning, Joseph Scaliger, in 1582, invented what he called (after Julius Cæsar) the Julian period, being a cycle of 7980 years, which is the product of the continued multiplication of 28, the number of the solar cycle, 19 that of the lunar, and 15 that of the indiction. The advantage of this construction of the period is, that the place of any of its years in any one of these cycles is at once found by a simple process of division. It is found that the first year of the Christian æra must, according to its position in these three cycles, have been the 4714th of the Julian period. We have therefore, in this period, a chronological measure which may be applied, if necessary, over all that space before the birth of Christ. But as some chronologers have carried the creation of the world, or the beginning of human history, back to a date

still more remote than B.C. 4714, a Capuchin friar, named Jean Louis d'Amiens, in 1683, proposed another period, to which (after Louis XIV.) he gave the name of the Louisian, composed of 15960 years, which number he produced by the multiplication of the numbers of the solar and lunar cycles not by 15, the number of the indiction, but by 30, the number from which the epact is reckoned. In this period the vulgar æra commences with the year 7373. But the Louisian period has been very little used by chronologers.

If the date of the creation of the world, or rather of man's appearance on the earth, could be certainly established, that would form the natural and most convenient point from which to commence the reckoning of time and to date the events of human history. None of the antient chronologers attempted to fix this point; a common opinion then held was, that the world was eternal; some conceived that any attempt to discover the commencement of its existence would be an act of impiety. Even among the Jews and Christians, whose sacred writings begin their record of events from the creation, there has been the greatest diversity of opinion as to that epoch. Kennedy in his 'Scripture Chronology,' affirms that 300 different opinions might be collected as to the length of time that elapsed between the creation and the incarnation. John Alb. Fabricius, in his 'Bibliotheca Antiquaria,' has given a list of 140 of these determinations. Dr. Hales, in his 'New Analysis of Chronology,' has collected above 120. In the 'L'Art de Vérifier les Dates,' vol. i., p. xxvii., &c., is given a list of 108. Playfair has given one of 88. Desvignoles, in the preface to his 'Chronology of Sacred History,' asserts that he has collected above two hundred such calculations, of which the longest makes the distance between the two points to have been 6984, and the shortest only 3483 years.

The uncertainty and controversy upon this subject have been principally occasioned by the disagreement in the ages assigned to the Patriarchs, and in other numbers, between the Hebrew text of the Old Testament, and the texts of the Samaritan and Septuagint versions. From the creation to the deluge the computation of the Hebrew text makes 1656 years to have elapsed; the Samaritan version only 1307; and the Septuagint 2262. The common opinion of modern theologians, and also of chronologers, has been that the Hebrew text is correct; and it is upon this assumption that Archbishop Usher, whose reckoning has been most generally adopted, has fixed the distance between the creation and the birth of Christ at 4004 years. But those who hold a contrary opinion, although the least numerous, have, according to Bayle, been usually *des savans d'élite*, inquirers of a superior order. It is maintained by Father Pezron, in his work 'De l'Antiquité des Tems,' that the Hebrew text was designedly corrupted by the Jews in the first century, and the time that had elapsed from the creation made to appear shorter than it really was, in order to meet the argument derived from what is said to have been an old Jewish tradition, that the coming of the Messiah should take place when the world was six thousand years old. Rabbi Akiba is supposed by Pezron to have been the author of the falsifications. Pezron makes the world to have been 5872 years old at the birth of Christ. The supposition of the corruption of the Hebrew text, and the preference due to the Greek translation of the LXX., has been recently adopted and supported by Dr. Hales, who will scarcely however be reckoned one of the *savans d'élite*.

Among modern systems of chronology, one of the most remarkable and peculiar is that proposed by Sir Isaac Newton, in his posthumous work, 'the Chronology of Antient Kingdoms amended,' 4to., London, 1728. Newton, assuming the nearly entire valuelessness of the determinations of the dates of antient events by the Greek chronologers and their followers, proceeds to form a new system on considerations wholly independent of their authority. In the first place he has endeavoured to show that the antient historians, when 'a little after the death of Alexander the Great, they began to set down the generations, reigns, and successions, in numbers of years, by putting reigns and successions equipollent to generations, and three generations to 100 or 120 years (as appears by their chronology), have made the antiquities of Greece three or four hundred years older than the truth.' He contends that the reigns of kings on an average do not exceed eighteen or twenty years. Secondly, he has endeavoured to ascertain the date of the famous Argonautic expedition by an ingenious calculation founded upon the known precession of the equinoxes at the rate of a degree in seventy-two years*, and the assumption of the equinoctial and solstitial colures having at the time of the expedition cut the ecliptic in the cardinal points. From these data he determines the expedition to have taken place about the year B.C. 928, which gives an antiquity less by about three centuries than that commonly assigned to the event. But the grounds on which Newton has assumed the position of the colures at the time of the expedition are now generally acknowledged to be quite insufficient. Although the full exposition of this system was not published till after the death of the author, its general principles got abroad during his lifetime, and were attacked from various quarters. The two chief early assailants of the Newtonian chronology were the learned French Jesuit Souciet, and Nicolas Freret, known for his many valuable contributions to the memoirs of the Academy of Inscriptions. In latter times the system has been examined by Playfair (pp. 35—37), and by Hales (vol. i., pp. 26—29). See also Sir David Brewster's late *Life of Newton*, and a valuable note by M. Daunon to the article on Newton by Biot in the 'Biographie Universelle,' vol. xxxi., pp. 180—186. Clinton denies that the general uncertainty of the early Greek chronology is so great as is supposed by the scheme of Newton.

Although Newton's deduction of the date of the Argonautic expedition from the precession of the equinoxes cannot be depended on, owing to the want of any authority for the position of the colures at the time of the expedition, the science of astronomy has in another way rendered valuable assistance to that of chronology. This it has done by the means which it affords of ascertaining the exact date of many eclipses of the sun and moon which are recorded by antient writers, and are sometimes connected by them with historical events that happened at or near the same time. In the first volume of the great French work, 'L'Art de Vérifier les Dates' (pp. 146-265), are given lists first of all the eclipses of the sun and moon which could have been seen to the north of the equator for ten centuries preceding the birth of Christ; and secondly, of all those recorded before that epoch by antient writers. In a subsequent volume of the same work there is inserted a list of the visible eclipses that have happened since the commencement of the vulgar æra. Lists of eclipses, solar and lunar, are also given in Playfair's 'Chronology,' pp. 175-219. As an example of the astronomical examination of a recorded antient eclipse, see the article ALYATTES.

One of the earliest of the Christian systematic chronologers is Sextus Julius Africanus, who appears to have flourished in the first half of the third century. Of his chronological work, entitled 'Pentabiblos,' however, beginning with the creation, which he dated B.C. 5499, and ending with A.D. 221, only some fragments remain. [AFRICANUS, vol. i. p. 190.] The most important of the works of the early Christian chronologers which we now possess is the Chronicon of Eusebius Pamphili, bishop of Cæsarea, in the fourth century, of which an edition was published with notes by Joseph Scaliger in 1658, in one volume folio, containing the Latin translation by Saint Jerome, and Scaliger's attempted restoration of the lost Greek text. The Armenian version of the Chronicon of Eusebius, which is more complete than the previous editions, was published at Venice in 1818, with a literal Latin translation, and another Latin translation of it, in the same year, at Milan. There is a famous Spanish commentary upon the Chronicle of Eusebius, by Alfonso Tostato, printed at Salamanca, in five volumes folio, in 1506. The work which is to be considered as having laid the foundation of the modern science of chronology is that of Joseph Scaliger, 'De Emendatione Temporum,' first published in folio at Paris in 1583, and afterwards, much augmented and amended, at Leyden in 1598, and at Geneva in 1629. Another important work of that age is that of Dionysius Petavius, or Petau, 'De Doctrinâ Temporum,' two vols. folio, Paris, 1627, with the Continuation in one vol. folio, Paris, 1630, entitled 'Uranologion, sive Systema variorum auctorum qui de Sphæra ac Sideribus, &c. commentati sunt.' An abridgment of this work, under the title of 'Rationarium Temporum,' was published at Paris in 8vo. in 1630, and has been several times reprinted. Of other early continental works on chro-

* Properly a degree in about 71½ years.

nology the following are some of the most valuable, or the most celebrated:—Sethi Calvisii 'Opus Chronologicum,' Leips. 1603, often reprinted; J. Bapt. Riccioli, 'Chronologia Reformata,' 2 vols. fol., Bonon. 1669; 'L'Antiquité des Tems rétablie et défendue,' par le Père Paul Pezron, Paris, 4to., 1687, and the Defence of that work by the author, Paris, 4to., 1691; Hier. Wecchietti Florentini, 'Opus de Anno Primitivo ab exordio Mundi ad Annum Julianum accommodato,' fol., August. Vindel., 1621, a work for which the learned and unfortunate author was shut up during the remainder of his life in the prisons of the Inquisition, his crime being his maintenance of the opinion that Christ did not celebrate the passover the last year of his life, and, in instituting the Eucharist, did not make use of unleavened bread; Philippi Labbe et Philippi Brietii 'Chronologia Historica,' 5 vols. fol., Paris, 1670; 'Chronologie de l'Histoire Sainte,' par Alphonse Desvignoles, 2 vols. 4to., Berlin, 1738. The work of the Benedictine monks, Maur d'Antine, Durand, and Clemencé, first published in 1 vol. 4to. at Paris, in 1750, has, in the latest edition, extending to 38 volumes 8vo., published at Paris, 1818-1831, become the most extensive and important work on general chronology that exists. The principal works by English authors upon this science are the 'Chronicus Canon Ægyptiacus, Ebraicus, et Græcus,' of Sir John Marsham, fol., London, 1672, and also Leipzig, 1676, and Francfort, 1696; Archbishop Usher's 'Annales Utriusque Testamenti,' fol., Lond., 1650, and several times reprinted; Sir Isaac Newton's work, already noticed; Jackson's 'Chronological Antiquities,' 3 vols. 4to., 1752; Blair's 'Chronology and History of the World, from the Creation,' fol. 1754, and again, 1768, with additions; Kennedy's 'Complete System of Astronomical Chronology, unfolding the Scriptures,' 4to., 1762; Playfair's 'System of Chronology,' fol., Edin., 1784; and the Rev. Dr. William Hales's 'New Analysis of Chronology, in which an attempt is made to explain the History and Antiquities of the Primitive Nations of the World, and the Prophecies relating to them;' 3 vols. 4to., 1800-1812. There is also a useful introduction to chronology by Bishop Beveridge, entitled 'Institutionum Chronologicarum Libri Duo, una cum totidem Arithmetices Chronologicæ Libellis,' 8vo., Lond., 1669, and several times reprinted. Particular portions of antient chronology have been ably illustrated by Corsini in his 'Fasti Attici, in quibus Archontum Atheniensium series, Philosophorum, aliorumque illustrium virorum ætas, atque præcipua Atticæ Historiæ capita, describuntur,' 4 vols. 4to., Flor., 1744—61; by Wesseling, in his edition of Diodorus Siculus, 2 vols. fol., Amster., 1745; by Dodwell, in his 'Annales Thucydidei et Xenophontei,' 4to., Oxford, 1702; and by Larcher, in his 'Essai de Chronologie sur Hérodote,' already mentioned. But in so far as the Greek chronology is concerned, the most comprehensive, elaborate, and valuable work that has appeared is that of Mr. H. F. Clinton, entitled 'Fasti Hellenici: the Civil and Literary Chronology of Greece, from the earliest accounts to the death of Augustus,' now completed in three volumes 4to., of which the first, comprising the Chronology from the earliest accounts to the time of Pisistratus, was published at Oxford in 1834; the second, comprising the period from Pisistratus to Ptolemy Philadelphus, in 1824; and the third, completing the review to the end of the reign of Augustus, in 1830.

The volumes of chronological tables that have appeared are too many to be enumerated. Several of the systematic works on chronology that have been mentioned contain collections of such tables. The only other work which we shall mention is a most useful and, as far as we have examined it, very accurate publication, in one small volume, by Sir Harris Nicolas, entitled 'The Chronology of History' (1833), forming the 44th volume of Dr. Lardner's 'Cabinet Cyclopædia.'

[See the articles Æra, Epact, Epoch, Cycle, Day, Month, Year, Indiction, &c.]

CHRONOMETER, a name applied to those timekeepers which are used for determining the longitude at sea, or for any other purpose where an accurate measure of time is required, combined with great portability in the instrument. The general appearance of what is termed a pocket chronometer is that of a common watch, and it is generally made to go the same time, with once winding up, namely 30 hours. Those used for nautical purposes are larger, having dial-plates from three to four inches in diameter, and are usually made to go from two to eight days between each time of winding up; they have, in addition to the hour, minute, and seconds', circles, one on which a hand denotes the time in days that the piece has been going since the last winding up. Each chronometer is well secured in a brass box, mounted on gimbals in order that the machine may preserve one uniform position, and enclosed in a mahogany case.

A chronometer, like a common watch, has for its moving power a main-spring, the variable force of which is equalized or rendered uniform by the introduction of the fusee, a very beautiful contrivance, which, when properly made, completely answers the intended purpose. This fusee is nothing more than a variable lever, upon which the main-spring acts through the medium of the chain. A common observer would say of the fusee that it was a sort of cone upon which the chain was wound from the barrel by the operation of winding up the machine; but it is in reality a mathematical curve which has this peculiar property, that as the chain winds upon it, the distance from the centre of motion of the fusee to the semidiameter of the chain which is in contact with it continually varies; and also that it varies in this proportion, viz.: that the distance of the centre of motion of the fusee to the semidiameter of the chain at that point where it leaves the fusee for the barrel, multiplied by the force of the main-spring acting on the chain at that time, shall be what mathematicians term a *constant quantity*: that is, shall be the same whatever point of the fusee may be taken. Thus: suppose the chain, which receives its power to turn the fusee from the main-spring, pulls with a force of 9 oz., and that the distance from the centre of motion of the fusee to the semidiameter of the chain at that part where it leaves the fusee is 42 hundredths of an inch, or, expressed decimally, ·42; then $9 \times ·42 = 3·78$. Now let the spring be wound up to different points at which its force will be respectively 12 oz., 18 oz., 20 oz., 30 oz., and 40 oz., the corresponding distances at which the clain must pull from the centre of the fusee will be respectively ·315, ·21, ·189, ·126, and ·0945 of an inch, for $·315 \times 12 = 3·78$, $·21 \times 18 = 3·78$, $·189 \times 20 = 3·78$, $·126 \times 30 = 3·78$; and $·0945 \times 40 = 3·78$. Thus at any given distance from the centre of motion of the fusee, its power to turn any machinery is uniformly the same; and as the great or main wheel, which communicates motion to all the rest, in the watch or chronometer, is attached to the fusee, their centres of motion coinciding with each other, it follows that the power at the teeth of the main wheel is perfectly uniform: this power is transmitted through the medium of a train of wheels and pinions till it comes to the escapement, which is of the detached kind. It is necessary here to observe, that by a detached escapement is meant one in which the impulse which causes the balance to vibrate is given suddenly, and the balance performs two vibrations before it receives another impulse; so that the balance vibrates nearly independently of the maintaining power, the impulses being given so rapidly that the force applied acts on the balance during an extremely small part of one out of every two vibrations.

A chronometer differs from a common watch, in the escapement which has been just described, and in having a compensation for heat and cold. We shall here describe only the peculiar mode of effecting this compensation, as applied in a modern chronometer. It consists in having what is technically termed an expansion balance; this balance, with its appendage, the balance-spring, forms a very important part of a modern timekeeper; and there are few mechanics who can begin and finish this part alone; when they can do this, and adjust the machine to time, it is a proof they possess talents of no ordinary kind, for it requires a keenness of sight, a delicacy of touch, a degree of patient perseverance combined with tact and judgment in detecting errors, almost beyond belief; and last, but not least, a temper not to be ruffled by oft-repeated disappointments.

The figures 1 and 2 represent each a balance; some being made with weights, W W, as in figure 1; others with screws, as in figure 2. The nature and purposes of this balance will be best understood by explaining the mode of manufacturing one of them.

A circular piece of steel, of the thickness of the intended balance, is turned perfectly true, with a small hole in its centre, in which its arbor or axis is afterwards secured, and upon which it is ultimately poised; the piece of steel is then put into a melting pot (sometimes secured to it by a pin through the hole in the centre) with a sufficient quan-

Fig. 1

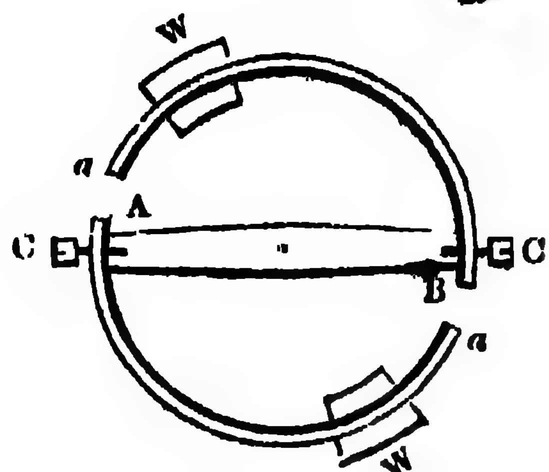
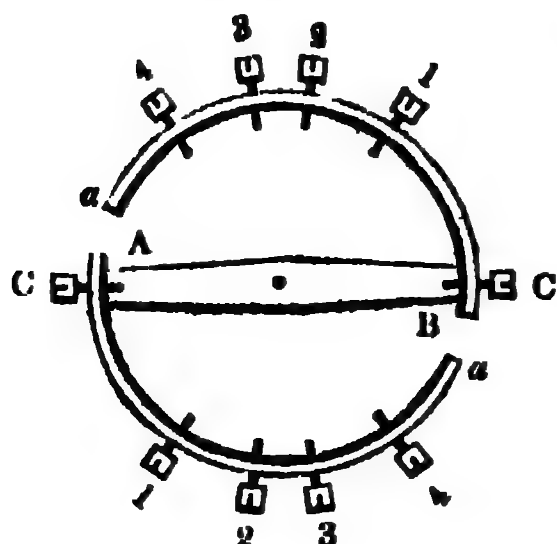


Fig. 2.



tity of fine brass to cover the steel when the brass is melted. After having cooled gradually, the superfluous brass is filed away from each side of the flat piece of steel, so that the steel is completely cleared of brass everywhere, except on the edge: by this means the artist is enabled to judge of the comparative soundness of the juncture of the ring of brass to the steel which it now encircles, and if any unsoundness appears it is thrown aside; if perfectly sound, the brass is now reduced by a file upon its outer edge, so as to present a ring of tolerably equal thickness all round, and is left about double the thickness wanted; it is then very carefully condensed either by the hammer or a burnisher as equally as possible, after which the steel is turned out of the centre and the brass from the outer edge, leaving a compound ring perfectly true of the proper thickness for the balance, and having the brass part about twice the thickness of the steel. Within the steel rim a bottom is left, out of which the bar A B is cut; the cutting through of the compound rim is the last thing done to the balance previous to its required adjustment, and this is done by dividing it on opposite sides, as shown in the figures by the letters *a, a, a, a*; so that each arm may present nearly a semicircle, secured at one end to the bar A B, and being free to move through the rest of its length, as will be shown when we explain the principle of action. In those balances where weights are used, a piece of brass is turned somewhat thicker than the balance, a groove is also turned in it whose depth is equal to the thickness of the balance, and breadth is just sufficient to allow the brass to move round on the balance with a slight pressure when formed into the weights W W, which are secured in their places by a small screw through their outer edge pressing against the rim of the balance. Two screws, C C, are called mean-time screws, and are merely used for altering the rate of the time-keeper, having nothing to do with the compensation.

The principle upon which this balance acts is as follows:—an increase of temperature diminishes the elastic force of the balance-spring, which would cause the machine to lose; but the same degree of heat expands the outer rim of the balance, which is brass, more than it does the inner one, which is steel; and not being able to separate, a curvature of the whole arm takes place, which carries the weight W towards the centre, and thereby the inertia of the balance is so much lessened as to allow the balance-spring to exert the same influence over the balance as it had previous to the change of temperature. Again, a diminution of temperature increases the elasticity of the spring, which would cause the machine to gain; but the brass contracting more than the steel, produces a curvature of the arm outwards, which increases the inertia of the balance, and allows the spring no more influence over it than it had previous to the change of temperature. The proper situations of the weights W W are found by experiments on the rate of the machine. It is evident that the nearer the weights are to the moveable ends *a a* of the arms, the greater will be the space through which they move by any change of temperature, and consequently the greater the variation in the inertia of the balance; whence, if an increase of temperature causes the machine to lose, or a decrease of temperature causes it to gain, it shows the compensation not to be sufficiently active; or, in other words, the inertia of the balance is not altered sufficiently to compensate for the effect produced by the increased or diminished elasticity of the spring, and consequently the weights must be set nearer to the moveable ends *a a* of the arms. If an increase of temperature causes the machine to gain, or a decrease to lose, then the weights must be moved farther fromthe moveable ends *a a* of the arms. In adjusting those balances made with screws, it will readily be perceived that the moving in or out the screws 4 4 will produce a greater effect than 3 3, and these again a greater than 2 2, and so on; and also that in the adjustment two opposite screws must always be moved in or out the same quantity: it will be further seen, that the mean-time screws C C can produce no effect on the compensation, as no motion is given to them by the curvature of the arms. It has been found by experiment, that in every balance-spring of sufficient length, there is a part of it which will be isochronal, or nearly so, and this length being found, it is not desirable to alter it in bringing the machine to time; for, if it be shortened, the long vibrations will be quicker than the short ones, and if lengthened, the short vibrations will be quicker than the long ones; and to avoid this source of error, the two screws C C have been introduced, the drawing out of which from the centre causes the machine to lose, and the screwing them in to gain. Considerable advantages have been anticipated by some persons from the application of a balance-spring of glass, the invention of Mr. Dent, of the firm of Arnold and Dent, of the Strand, London, but we believe it is not yet in a state to induce the inventor to bring it before the public, though we are informed that there is every prospect of ultimate success.

The following have been some of the most eminent chronometer-makers in this country, which has certainly produced them superior to those of any other nation in the world:—Harrison, Mudge, Earnshaw, Sen., Arnold, Sen., Brockbank, Barraud, and Messrs. Arnold and Dent.

CHRONOMETER, in music, an instrument by which the movement, or time (*i.e.* the quickness or slowness) of a composition is determined.

The musical chronometer is by no means a modern contrivance; so far back as the year 1636 Mersenne described and recommended it, in his *Harmonie Universelle;* and Malcolm, a very sensible writer, urged its use more than a century ago. Yet, owing to the prejudices of musicians, it has till lately not been employed, though its utility has never been disputed by any person of discernment, Diderot only excepted, who most likely was led astray by some bigot incapable of taking a clear view of the subject. We must however do Dr. Crotch, an enlightened professor, the justice to say, that it is now upwards of thirty years since he advocated the use of a pendulum. The opponents of a *time-measurer* either blindly or wilfully presume that it is meant rigorously to govern the *whole* of a composition, and that thus the beautiful effects of acceleration and retardation are to be sacrificed; but those who have advised the employment of a pendulum never contemplated its being used for any other purpose than to indicate the time to be adopted at the *commencement* of a movement. From the want or neglect of some contrivance by which the intention of composers might have been transmitted, we are now obliged to guess the true movements of the most classical works; and it is notorious that many compositions of the highest excellence, and among them several of recent date, are frequently performed in times which could not have been intended, because by good critics admitted to be exceedingly prejudicial to their effect. The invention, by the ingenious M. Maelzel, of a most accurate and convenient machine which he calls a Metronome, is beginning to convince musicians of the utility of a pendulum; and we are persuaded that not many years will elapse before it will be universally adopted, both by composers and performers. [METRONOME.]

CHRUDIM, a circle in the eastern part of Bohemia, is bounded on the north by the circle of Königgrätz, and on the east and south by Moravia. Its area is 1218 square miles, and it contained, in 1817, a population of 248,758, and in 1834 of 300,100 inhabitants, who are chiefly native Bohemians. The circle is traversed in the western part by the Elbe, and along its whole length, from east to west, by several rivers, which form a junction, and receiving the name of Chrudimka, fall into the Elbe near Königgrätz. The eastern division of the circle, where it joins the Glatz chain, is mountainous and thickly wooded; the western part is level, and watered by numerous streams; it also contains about 400 ponds. The soil is fertile and produces excellent corn, hay, clover, &c. and flax; it abounds in pasture and woodland, game, fish, &c., and contains also iron, some mineral springs, and precious stones. Much attention is paid to the rearing of horses; but the chief employment of the inhabitants is manufacture of flax and wool; there

are likewise extensive potteries, glass-houses, and paper-mills. The circle contains 9 towns, 25 market-towns, and 761 villages.

The chief towns of the circle, besides Chrudim, the capital, are Leitomeschl on the Lauzna, containing 5806 inhabitants, a college, gymnasium, and manufactories of linen, spirits, &c. Pardubits, a royal town at the junction of the Chrudimka with the Elbe, with 3665 inhabitants, a high school and establishments for rearing horses for the army; Landskron, with 4246 inhabitants; manufactories of chintz, cottons, and linens; dyeing, bleaching, &c. Hohenmauth on the Meyto, 4568 inhabitants, factories of cloth; Policzka, 2823 inhabitants, contains a high school, and carries on trade in cloth, flax, and linen; and Wildenschwerdt, 2878 inhabitants, has manufactories of cloth and linens.

CHRUDIM, the capital of the circle, a royal appanage, lies on the right bank of the Chrudimka. It is well built, surrounded with walls, and contains a magnificent collegiate church, a capuchin convent, and a high school (Hauptschule). It is the seat of the local government, and, in 1834, had a population of 5625 inhabitants. The city has its own civil court. The time of the foundation of Chrudim is not known; but it is certain that it was reckoned one of the Bohemian towns in the year 1055. N. lat. 49° 46′., E. long. 15° 50′.

CHRY'SALIS. [PUPA.]

CHRYSA'NTHEMUM, a name applied to a genus of composite flowers, most of which are wild in different parts of Europe, and of little general interest; it is however popularly known from its also comprehending the Chrysanthemum Sinense, a Chinese half-shrubby plant, whose numerous varieties constitute one of the chief ornaments of gardens in the months of October, November, and December. The native state of this species is not certainly known, all the many varieties now in gardens having been bought in the markets of Macao, from the Chinese traders. In the cultivated state the plant has bluish-green broad leaves with sharp serratures and deep lacerations: and the flower-heads consist exclusively of ligulate florets of almost every colour, except blue. Pure white, bright yellow, deep and pale red, rich purple, and a dark morone brown, occur in different varieties of this favourite flower, and together contribute to the beauty for which the species is so much admired. It is probable that the numerous varieties cultivated by the Chinese and now introduced to Europe have been the result of ages of careful improvement, and that their properties have been derived partly from mere sporting and partly from intermixture with allied species unknown in Europe; for among those now cultivated are varieties remarkably different in constitution, some being capable of bringing their beautiful flowers to perfection in the open air, and others hardly unfolding them even beneath the atmosphere of a green-house or stove. They all strike root with great facility by cuttings, which should be taken from the parent plant at midsummer, and planted in a cool frame under a bell-glass. After rooting they may be successively transferred from one sized pot to another, until they have formed two or three stout stems ready for flowering, when they must be finally left at rest. If the soil in which they grow is rich, and the air cool and moderately moist, with a free exposure to light, cuttings struck at midsummer will flower beautifully in the succeeding autumn. The size and perfection of their flowers is increased by about half of the flowerheads that naturally appear being destroyed. As the varieties of this plant are very different in their degree of hardiness and beauty, the following classification of them is transferred from the pages of the Horticultural Transactions:—

1. *Flowers large or showy; requiring protection.*

Superb white.	Tasselled white.
Paper white.	Semi-double quilled white.
Sulphur yellow.	Quilled flamed yellow.
Golden yellow.	Tasselled lilac.
Curled lilac.	Large lilac.
Curled blush.	Blush ranunculus flowered.
Semi-double quilled pink.	Brown purple.
Starry purple.	Two-coloured red.
Early crimson.	Pale buff.
Pale flamed yellow.	

2. *Flowers large or showy; quite hardy.*

Quilled white.	Changeable white.
Superb clustered yellow.	Tasselled yellow.
Golden lotus-flowered.	Small yellow.
Parks's small yellow.	Early blush.
Rose or pink.	Pale pink.
Purple.	Changeable pale buff.
Buff, or orange.	Spanish brown.

3. *Flowers large or showy; but produced sparingly.*

Semi-double quilled orange.	Quilled light purple.
Expanded light purple.	Two-coloured incurved.
Large quilled orange.	

4. *Flowers small, or late; not worth cultivation.*

Double Indian white.	Late pale purple.
Yellow warratah.	Double Indian yellow
Windsor small yellow.	Late quilled yellow.
Quilled salmon colour.	Quilled yellow.
Semi-double quilled pale orange.	Quilled pink.

The varieties of the 2nd class may be cultivated without any protection by having their stems pegged down upon the surface of the earth so as not to be allowed to rise more than a few inches above it when in flower. So treated they form a charming ornament of a flower-garden; but the other kinds do not like this treatment.

Lately seeds of these plants have been obtained at Oxford and in Jersey, and many new varieties have been raised, among which are some that rival the handsomest of the Chinese sorts; but not much is at present known of their merits. None of them can however be compared to the 'two-coloured incurved,' which is the finest and rarest of the whole.

CHRY'SAOR. One of the numerous genera into which De Montfort divided the belemnites.

CHRYSA'ORA, (Zoology). [MEDUSA.] Also applied to a genus of polypifers of the family *Milleporidæ*. [MILLEPORIDÆ.]

CHRYSI'DIDÆ, a family of Hymenopterous insects of the section *Pupivora*. Distinguishing characters:—No nervures to the under wings; terminal segments of the abdomen forming a jointed retractile ovipositor; abdomen of the females with only three or four distinct segments, concave or flat beneath; antennæ thirteen-jointed in both sexes, and geniculated; mandibles slender, curved, and pointed; maxillary palpi filiform, generally longer than the labial palpi, and five-jointed; the labial palpi are generally three-jointed.

The Chrysididæ are most of them, if not all, of parasitic habits, that is to say, they seek the nests of other insects where they deposit their eggs to the destruction of the rightful owners; each species of this family apparently confining its attacks to the nest of some other Hymenopterous insect, and generally selecting those of the same species. They are all of brilliant colouring, very active, and fly about in the sunshine; some are seen upon flowers, and most of them upon old walls, palings, and sand-banks. Some of these species are called *ruby-tail flies*.

Chrysis ignita will afford a good illustration of this family. This insect is rather less than half an inch in length, has the head, thorax and legs of a rich blue or green colour, and the abdomen of a burnished golden-copper hue; this part is truncated at the apex, and furnished with four little spines.

It will be perceived that the above is a description of a little four-winged fly, which so often attracts our notice from its brilliant colouring, and is so common on our garden walls when the sun is on them. This little insect is in constant motion, for if it ceases running or flying for a moment its little horns still keep up their vibratory motion. If we watch one of these insects for a short time, we perceive that it thrusts its head into every little hole in the brick-work; it is then searching after the nest of a wasp-like insect which builds in these situations.

The principal genera comprised in the family *Chrysididæ* are Panorpes, Chrysis, Stilbum, Hedicrum, Elampus, and Cleptes. An account of the habits of one of the species of Panorpes will be found under the head *Bembex*, where the habits of *Bembex rostrata* are given, that being the species whose nests are subject to the attacks of the Panorpes which we are about to describe.

The genus *Panorpes* is distinguished from the other genera above mentioned principally by the elongated maxilla and labium, which appear like a proboscis, and the palpi being very small and two-jointed. *Panorpes carnea* is

about half an inch in length, and considerably broader than the *Chrysis ignita* (above described); the head, thorax, and base of the abdomen are of a blue-green colour; the remainder of the abdomen and the legs (with the exception of the thighs, which are blue) are of a reddish-yellow colour. It is found in various parts of Europe, but has not yet been discovered in England.

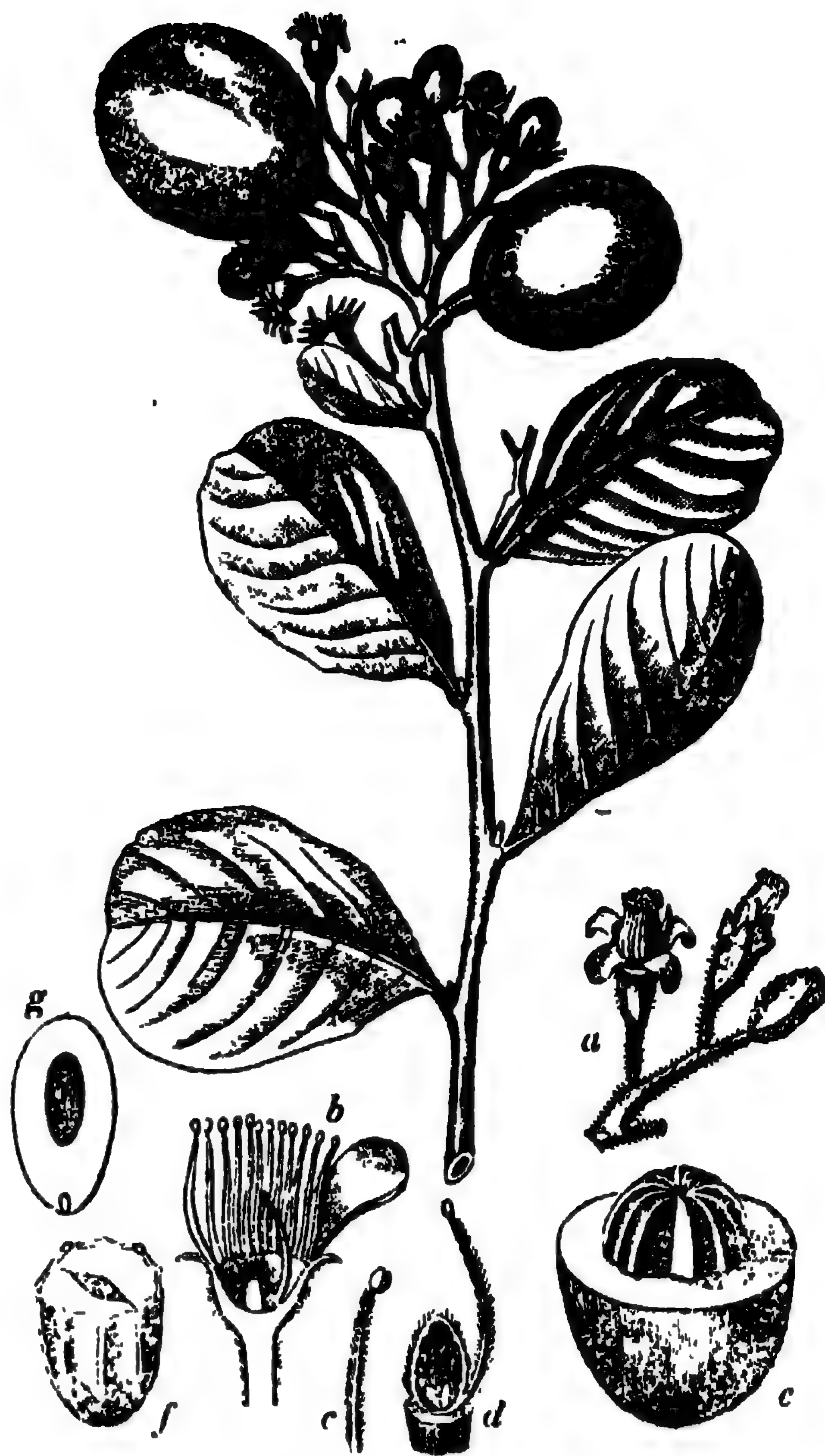
The technical characters of the genus *Chrysis* are:—Maxillary palpi five-jointed, and longer than the labial; labial palpi three-jointed; thorax not narrowed in front; labium rounded. About six or seven species of this genus are natives of England. *Chrysis bidentata* is rather less than *C. ignita*, and differs from that species in having the thorax as well as the abdomen of a rich copper-like hue: the latter however has the apex blue. *Chrysis cyanea* is entirely of a blue colour.

CHRYSIPPUS, son of Apollonius, was born at Soli in Cilicia, B.C. 280. He appears to have been driven to study by having, in some way, lost or squandered his patrimony. When he determined on devoting himself to philosophy he went to Athens, and attended the instructions of Cleanthes, whom he afterwards succeeded. (Strabo, xiii., p. 610, Casaub.) Cicero (*De Nat. Deor.* ii. 6.; iii. 10), in common with other antient writers, describes Chrysippus as a skilful and acute dialectician, and (i. 15) accounts him the most ingenious expositor of the Stoic dreams. Habits of industry probably gave him an advantage over his rivals. Diogenes Laertius reports, upon the authority of Diocles, a statement of Chrysippus's nurse, that he seldom wrote less than 500 lines a day. It appears however that he indulged largely in quotations; and the actual amount of his original labour in composition cannot be gathered from the number of his productions. He is said by Diogenes to have written upwards of 705 volumes, many on the same subject. Cicero (*Tusc. Quæst.* i. 108) gives him the character of a careful collector of facts. After Zeno he was considered the main prop of the Porch (Cic. *Acad. Quæst.* iv. 75); and allusions are frequently made to the estimation in which he was held. (Juvenal, *Sat.* ii. 5; xiii. 184; Horace, *Epist.* i. 2. 4.)

Chrysippus sometimes exposed himself to the attacks of his enemies, Carneades in particular, by defending two opposite sides of the same question: but the arguments which were good in his were good also in others' hands. He frequently succeeded in entangling his hearers by the use of the logical form *sorites*, which is said to have been invented by him, and is called by Persius (*Sat.* vi. 80) 'Chrysippus's heap.' Sorites (σωρείτης) means 'a heap,' and is in logic a heap of propositions in the syllogistic form. (Cic. *Acad. Quæst.* iv. 16; Whately's *Logic*, p. 122.) Chrysippus did not spare his adversaries in his replies to their arguments; and some anecdotes which are told of him seem to show that he occasionally overstepped the bounds of moderation. Notwithstanding this, his style of argumentation was so much admired, that it was said, if the gods themselves were to use a system of logic, they would adopt that of Chrysippus.

Chrysippus appears to have held substantially all the main doctrines of the Stoic theology, though in some minute particulars he is said to have differed from Zeno and Cleanthes: the charges of impiety made against him are probably to be ascribed only to a peculiar method of advocating his opinions. He died, apparently from an apoplectic fit, at the age of seventy-three, B.C. 207. (Diogenes Laertius, book vii., *Life of Chrysippus*; Fabricii *Bibliotheca Græca*, vol. ii. pp. 392, 393.)

CHRYSOBALANA'CEÆ, a natural order of Polypetalous Exogens, allied to Rosaceæ and Fabaceæ (Leguminosæ), from which it differs in the style proceeding from the base of the ovary, and in its stamens being very irregular, often placed only on one side of the ovary. They are trees or shrubs, with alternate stipulate simple leaves, and flowers in loose racemes, corymbs, or panicles. Many species have no petals. They are exclusively natives of the tropics, where they often bear the name of plums. The grey or rough-skinned plums of Sierra Leone are produced by species of Parinarium, and the Callimato or cocoa plum of the West Indies belongs to Chrysobalanus Icaco. The fruit of the latter is described as long, black, clammy, sweet, and agreeable; the plant forms a shrub seven or eight feet high, with very long sharp-pointed leaves, dark green on the upper and pale on the under side: it loves a cool moist soil.



[Chrysobalanus Icaco.]

a, flowers in different stages of development; b, vertical section of the flower; c, stamen; d, vertical section of the pistil, showing the ovules in the base of the ovary; e, horizontal section of fruit, showing the inclosed nut; f, transverse section of nut; g, a cotyledon, with the plumule at its base.

CHRYSOBERYL, the *Cymophane* of Haüy, occurs massive and crystallized. Primary form, a right rhombic prism. Its colour is green, sometimes with a yellow or brown tinge, with occasionally a blue opalescence. Streak white. Lustre vitreous. It is translucent or transparent Specific gravity about 3·8. Hardness 8·5. Fracture conchoidal. Before the blow-pipe it suffers no change alone; with borax it fuses into a transparent glass.

The massive variety occurs in rounded pieces.

It is found in Brazil, and in Connecticut, North America.

Analysis. Seybert first found that it contained glucina. The following are his and Dr. Thomson's analyses:—

Seybert.		Thomson.	
Alumina .	73·60	Alumina .	76·752
Glucina .	15·80	Glucina . .	17·791
Silica . .	4·00	Protoxide of iron	4·494
Protoxide of iron	3·38	Volatile matter	0·480
Oxide of titanium	1·00		
Moisture .	0·40		99·517
	98·18		

CHRYSOCHLO'RA, a genus of Dipterous insects, of the family *Stratiomydes*. Technical characters:—Body elongated; antennæ with the basal joint short, the third long, conical, and compressed; stylet terminal, elongated; third posterior nervure of the wings not reaching the hinder margin.

Only three species of this genus are described; they are all of large size.

Chrysochlora amethystina is about three-quarters of an inch in length; the head and antennæ are black; there is a white spot at the base of each antenna; the thorax and abdomen are of a violet blue colour, the latter has a yellow spot on each side of the second, third, and fourth segments; the legs are black.

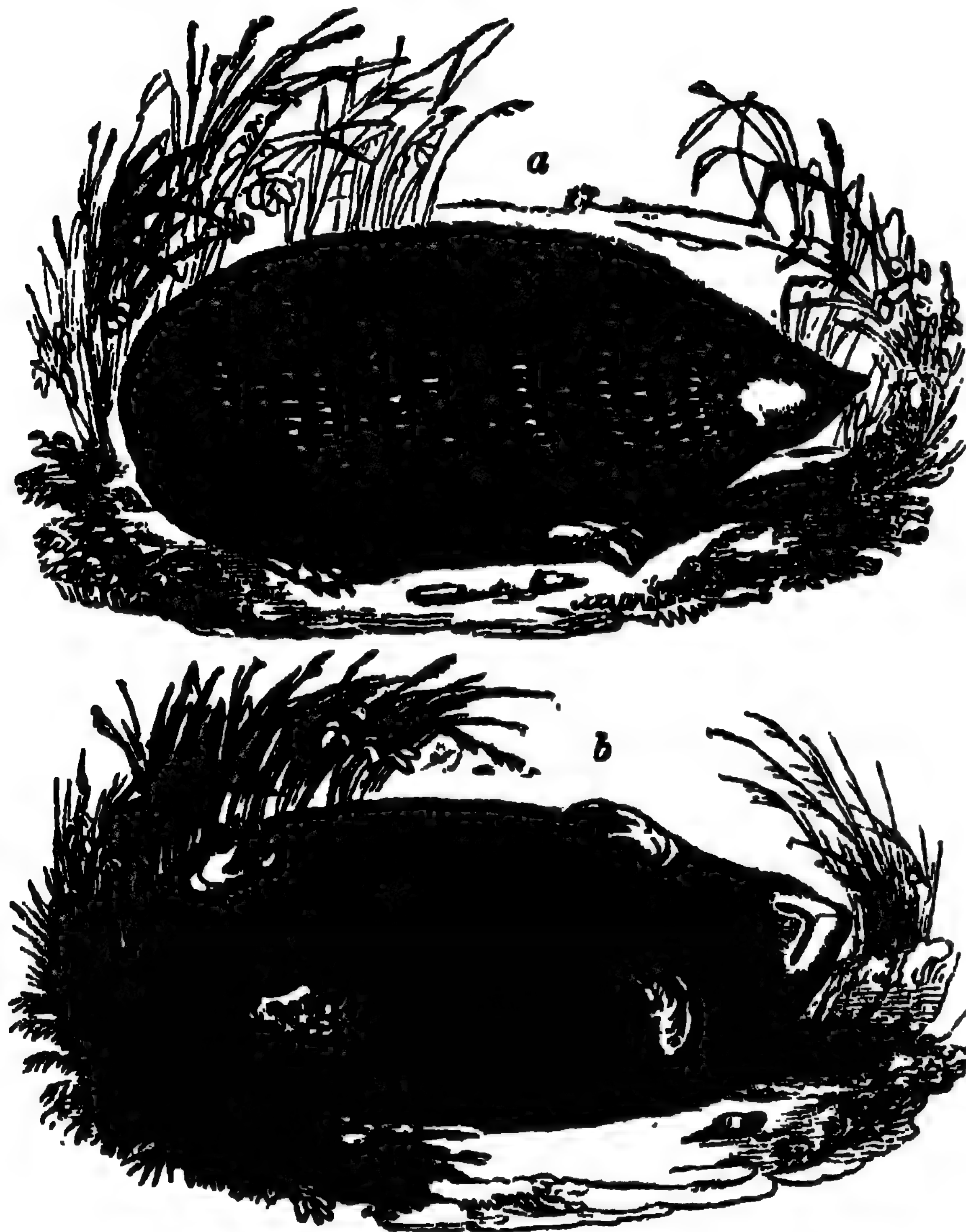
It inhabits the Isle of France and the East Indies. The remaining two species are from South America; their colouring is black and yellow.

CHRYSOCHLO'RIS, Lacepède's name for a genus of mammiferous animals allied to the moles (*Talpa*), but dif-

fering from them in their dentition and in other particulars. Dental formula:—Incisors $\frac{2}{4}$, canines 0, molars $\frac{9-9}{8-8}$ = 40. The true molars are long, distinct, and nearly all in the shape of triangular prisms.

The muzzle is short, wide, and reflected. There is no external ear, nor any appearance of the eye externally. The fore-feet have three claws only; the exterior claw is very large, arched, and pointed, forming a powerful instrument for penetrating and digging the earth; the other two diminish gradually. The hind feet are furnished with five claws of ordinary size. The fore-arm is supported by a third bone placed under the ulna, to strengthen it when the animal is employed in excavation. The body is thick and short. The hair, or rather fur, which is thick set, has a metallic lustre. Example. *Chrysochloris Capensis*, Desmarest; *Taupe dorée* of the French; *Talpa Asiatica* of Linnæus. Hair brown, presenting in certain lights very brilliant changeable green, bronze, and coppery tints. Cuvier says that it is the only quadruped whose covering reflects those metallic tints which render so many birds, fishes, and insects brilliant. There is no apparent tail.

Locality and Habits—The Cape of Good Hope, where it is said to live much in the same way as the mole, and to prey like it upon worms, &c.



[Chrysochloris Capensis]

a, the animal on its feet; *b*, the same turned up to show the claws, &c.

Lesson gives two species, the second being *Chrysochloris rufa* of Desmarest, *Talpa rubra* of Gmelin, described as having a short tail, four toes on the hind feet, the fur red inclining to bright ash, and as being somewhat larger than the European mole. *Locality*, Guyana. But Cuvier, in a note to the last edition of the 'Règne Animal' (where he gives only one species, *Chrysochloris Capensis*), says that the red mole of America (*Talpa rubra* of Gmelin), figured in Seba i., pl. xxxii., f. 1, is probably only a *chrysochloris* of the Cape, represented from a dried specimen, for in that state the fur would appear purple; but he adds that the *Tucan* of Hernandez ('Hist. Quad. Nov. Hisp.,' tract 1, p. 7, c. xxiv.), which is regarded as one of its synonyms, would rather appear, from its two long teeth in each jaw, to be a vegetable feeder, a *rat-taupe*, or some other subterranean rodent, such as the *Diplostoma*. Now pl. xxxii., fig. 1, in the first volume of Seba, is described by him to be *Talpa alba nostras*, a white European mole. Fig. 2 is indeed stated to be *Talpa rubra Americana*, the red American mole; but it is represented with a tail, and Seba describes it as having but four claws on the posterior feet. The dried state of the specimen might account for the colour, but not for the tail, and hardly for the four hind claws instead of five.

CHRYSOCOLLA. [COPPER.]

CHRY'SODON (Zoology), Oken's name for the *Pectinaires* of Lamarck, the *Amphictènes* of Savigny, and the *Cistenes* of Dr. Leach, forming a part of the genus *Amphitrite* of Cuvier, who well observes that these perpetual changes of names (and, he adds, in this case there is not even the pretext of a change of the limits of the group) will terminate in making the study of nomenclature more difficult than the study of facts. [TUBICOLÆ.]

CHRYSOGA'STER, a genus of Dipterous insects of the family *Syrphidæ*. Technical characters:—Body much depressed; no false nervures to the wings; third joint of the antennæ oval or orbicular.

About fourteen species of this genus have been discovered in England: they are all of moderate size, and their colouring is metallic.

Chrysogaster splendens is about one-third of an inch in length; the head is green; antennæ yellow; thorax golden-green; abdomen purple-black; greenish towards the sides; the legs are black; wings brownish.

This and all the other species recorded as British have been found in the neighbourhood of London.

CHRYSOLITE: *Peridot* of Haüy. Olivine is a variety of this mineral, and *Chusite* also, according to Dr. Thomson.

It occurs massive and crystallized. Primary form, a right rhombic prism. Colour green, sometimes brownish or yellowish; streak white. Lustre vitreous. Translucent, transparent, double refracting. Specific gravity 3·33 to 3·41. Hardness 6·5 to 7. Fracture conchoidal.

Massive varieties:—Amorphous; granular.

The chrysolite used in jewellery is brought from the Levant, and supposed to be found in Upper Egypt. The variety, on account of its colour called *olivine*, occurs in basalt in Bohemia, Hungary, and on the banks of the Rhine. The following are the analyses of

	Klaproth.	Vauquelin.
Silica . .	39·	38·
Magnesia . .	43·5	50·5
Protoxide of iron	19·	9·5
	101·5	98·0

Some varieties contain small portions of alumina and of the oxides of nickel and manganese. It does not fuse or lose its transparency before the blow-pipe. With borax it fuses into a coloured glass, and with soda into a brown scoria.

CHRYSO'LORAS, EMMANUEL, a learned Byzantine of the fourteenth century, was sent to Italy about 1397, by the Emperor Manuel Palæologus, to request the assistance of the Venetians and the pope, and the other Christian princes, against the Turks. Having fulfilled his mission, he settled at Venice, where he gave lessons in the Greek language. He afterwards taught the same at Florence, Pavia, and lastly at Rome, where he grew into favour with the papal court, and was sent to the council assembled at Constance, where he died in 1415. Poggio Bracciolini, Leonardo Bruni, and Filelfo, were the most distinguished pupils of Chrysoloras in Greek. Chrysoloras wrote a Greek grammar (entitled Ἐρωτήματα, *Questions*), which was one of the first published in Italy, and was afterwards printed at Ferrara in 1509. He also wrote several epistles in Latin, in one of which, addressed to the Prince John Palæologus, son of Manuel, he draws an eloquent comparison between Constantinople and Rome, which has been often quoted. Chrysoloras ranks among the restorers of classical learning in Italy.

John Chrysoloras, the nephew of Manuel, taught Greek in Italy: he returned to Constantinople, where he died, about A.D. 1427. Demetrius Chrysoloras, probably a native of Thessalonica, wrote on philosophy and theology. Some letters of his to the Emperor Manuel Palæologus still exist in MS., and some other works of no importance.

CHRY'SOLUS. One of De Montfort's genera, ranged under the genus *Nonionina* of D'Orbigny, belonging to the order *Foraminifera* of that author.

CHRYSOME'LIDÆ, a family of Coleopterous insects, of the section *Cyclica*. Distinguishing characters:—Antennæ wide apart at the base and inserted before the eyes; body generally short and convex; tarsi short and rather broad, four-jointed, the penultimate joint bilobed; all the

joints, excepting the terminal joint, covered beneath with a velvet-like substance.

The Chrysomelidæ constitute a very numerous and beautiful family of the beetle tribe: they are generally of moderate size, and frequently very brilliant in colouring.

Between seventy and eighty species have been discovered in England, and the number of species contained in collections from various parts of the world may probably amount to four or five hundred.

This group may be divided into two sections, those in which the head is hidden beneath the thorax, and the body is frequently somewhat cylindrical; and those in which the head projects from the thorax so as to be distinctly seen when the insect is viewed from above, and where the body is generally rounded, or oval, and convex.

The first of these sections may again be readily subdivided according to the proportions of the antennæ. In some, the antennæ are short and more or less serrated: here belong the genera *Clythra, Lamprosoma,* and *Chlamys.* The species of this last genus are among the most remarkable of coleopterous insects. They are of small size, the largest being about half an inch in length, and the thorax and elytra are generally very uneven, and studded with numerous angular projections. This circumstance, together with the extremely brilliant colouring with which they are adorned, has caused them to be compared to pieces of minerals; indeed, one which is now before us, and which is of a beautiful red hue, we have known to be mistaken at first sight for a piece of copper ore. Most of the species of Chlamys inhabit Brazil, and none are found out of the western hemisphere. The generic characters are:—head vertical; thorax humped; the posterior margin produced in the region of the scutellum; body somewhat cube-formed; antennæ with the basal joint rather long, the second very small; the remaining joints dilated, and more or less serrated; labial palpi sometimes forked.

The remainder of the Chrysomelidæ of the first section have the antennæ long and slender. The genera are *Cryptocephalus, Choragus, Euryope,* and *Eumo pus.*

The second section, or those in which the head is apparent when the insect is viewed from above, comprises the genera *Colaspis, Podontia, Phyllocharis, Doryphora Cyrtonus, Paropsis, Apamœa, Timarcha, Chrysomela Phædon,* and *Prasocuris.*

The genus to which the name *Chrysomela* is now restricted, is principally distinguished by the following characters:—maxillary palpi with the terminal joint as large, or larger, than the preceding one, and of the form of a truncated cone, or nearly oval; the elytra are separate, i. e., not joined at the suture: no sternal projection.

Upwards of forty species of this genus have been discovered in England.

Chrysomela Banksii is one of the largest species of the genus: it is rather less than half an inch in length, and of a brown colour with a metallic lustre; the thorax has an indentation running parallel with and close to the lateral margins: the elytra are coarsely punctured. the legs and antennæ are ochre-coloured. It is found on nettles in the neighbourhood of London and elsewhere, but is rather local. *C. sanguinolenta* is about three-eighths of an inch in leng h, and of a dull blue-black colour; the elytra are rather rough. *C. graminis* is about the same size as the last, and of a bright green colour; this species is abundant in various parts of Cambridgeshire. *C. polita* is about a quarter of an inch in length, and very glossy; the head, thorax, and legs are green, and the elytra are of a reddish ochre colour. This species is very common in marshy situations. *C. cerealis* is about the same size as *C. sanguinolenta.* This is one of the most beautiful species of the genus. It is tolerably common in France and Germany, but till found on the summit of Snowdon (within the last three or four years), was scarcely known as a British insect. It is very glossy; the legs, antennæ, and under parts are blue: the elytra are adorned with longitudinal stripes of blue, green, and red; and the same colours are observed on the head and thorax. *C. Goettingensis* is of a purple colour, and the elytra are very finely punctured. This species is very common in chalk districts. [CYCLICA.]

CHRYSO'PHILA, a genus of Dipterous insects. [LEPTIDES.]

CHRYSO'PHORA, a genus of Coleopterous insects, of the section *Lamellicorne,* and family *Xylophili.* The principal generic characters consist in the immense size of the hind legs of the males. The sternum is produced into a somewhat pointed process between the second pair of legs; the posterior thigh of the male is very thick; the tibiæ are curved and produced at the apex internally into a long bent process: the hind legs of the female are thick, but comparatively short, and the hinder tibiæ are abruptly terminated: the outer claws of all the tarsi are larger (in both sexes) than the inner; they differ in the male, however, in being broader than in the female, and those of the anterior pair of legs are bifid; their outer claws are very long, and the insect has the power of bending them under so as to fix their points beneath a projection of the fourth joint of the tarsus:* they are probably used for clinging to the slender branches or leaves of trees.

But one species of this genus is known—*Chrysophora chrysochlora;* it is of a rich metallic green colour; the head, thorax, and scutellum are shagreened; the elytra are rugose throughout; the tibia of the hind leg is of a brassy or copper-like colour; all the tarsi are blue-black. The length of the hind leg of the male exceeds that of the body, which is about one inch and a half; the female is rather less. This beautiful insect inhabits Columbia.

CHRY'SOPHRYS, a genus of fishes of the family *Sparidæ,* and order *Acanthopterygii.* The species of this genus are distinguished from their allies by their having at least four rows of teeth above and three below; those in front are somewhat conical, and the remainder are molars of a rounder or oval form; the body is deep and compressed; the operculum is covered with scales; branchiostegous rays, six.

One of the species of this genus, the *Gilt-head* (Chrysophrys aurata), has been met with off our own coast, but it is here extremely rare. One of its chief localities appears to be the Mediterranean. It is about twelve inches in length; the body is somewhat oval, tapering towards the tail; and the greatest depth (which is about one-third of the whole length) is a little behind the gill opening, above which part the dorsal fin commences, and continues (in a specimen twelve inches long) to within about an inch and a half of the root of the tail. The pectoral fins are long and pointed; the tail is slightly forked. The colour is grey above and silvery beneath; numerous longitudinal gold-coloured bands adorn the sides of the body, and there is a semilunar band of the same colour between the eyes.

CHRYSOPHYL'LUM CAINI'TO, a West Indian fruit, commonly called the star apple, and belonging to the natural order Sapotaceæ. Like the rest of its kindred, it abounds in a sweet harmless milky juice, that flows most copiously when the tree is beginning to mature its fruit, which grows on a moderately sized spreading tree, with very slender flexile branches. The leaves are dark green on their upper surface, and are covered beneath with a remarkably satiny ferruginous pubescence. The flowers grow in small purplish bunches, and are succeeded by a round, fleshy, smooth fruit, resembling a large apple. In the inside it is divided into ten cells, each containing a black shining rhomboidal seed, and surrounded by a white, or sometimes purplish, gelatinous pulp, traversed with milky veins, and of a very sweet agreeable flavour. In an unripe state, the taste is said to be astringent and unpleasant. When cut across, the seeds, which are regularly disposed round the axis of the fruit, present a stellate figure, from whence the name of star apple is derived. There is a smaller species, which produces the fruit called the damson plum. The tree is common in the hot-houses about London, and is well represented in a fruit-bearing state in Sloane's 'Jamaica,' plate 229.

CHRYSOPRASE: Green Quartz. [SILICON.]

CHRY'SOPS, a genus of dipterous insects, of the family *Tabanidæ.* Technical characters:—Head hemispherical; antennæ elongated, second joint nearly as long as the first, both covered with fine hairs: third joint equal in length to the first and second taken together, and having five false joints or divisions; eyes of a golden green colour, with purple lines or spots.

Eight or nine species of this genus have been discovered, two of which only are found in this country.

Chrysops cæcutiens is rather larger than the common house-fly, the expanded wings measuring about two thirds of an inch. It is black; the male has a yellow spot on each side of the first segment of the abdomen; the female, in addition to these spots, has the second segment yellow,

* This same structure may be observed in some other allied genera.

with two diverging black lines in the middle; the wings are whitish, the anterior border is broadly margined with black, and there is a broad black band near the middle: the wings of the male are nearly all black.

Most persons undoubtedly have been troubled more or less with the insect above described when walking in the country, especially in the neighbourhood of water. Three or four will sometimes settle on us at the same time, and if on the arm their presence is soon discovered by a sharp prick, caused by their thrusting the proboscis through the sleeve; the bite however is not venomous, and for the slight pain caused by it we are repaid by a sight of the little insect. Nothing can be more beautiful than its large eyes, which seem to reflect all the colours of the rainbow: they may be described as green with purple spots, but the green varies to golden and red hues in certain lights. When it first settles this fly is not easily caught, but it soon becomes so engaged in its occupation that it may almost be touched before it will move.

The other British species is the *Chrysops relictus*, which very closely resembles the one just described.

There is another genus of flies closely allied to Chrysops, and having the same habits; we mean the genus *Hæmatopota*, the principal characters of which are:—Antennæ with the basal joint generally long, thick, and downy in the male, conical and without down in the female; third joint with four divisions, of which the first is thick and longer than the others taken together; no ocelli; wings when at rest sloped like a roof.

Hæmatopota pluvialis is about the same size as the species of Chrysops just described; the eyes are green, having the under part purple, with yellow markings; the thorax is grey, varied with black; the body is black, with a central yellowish longitudinal line, and there is a row of spots of the same colour on each side of this; the wings are greyish, spotted with brown.

Four species of this genus are found in England; the one just characterized is very common.

CHRYSOSTOM. [DION.]

CHRYSOSTOM, ST. JOHN (χρυσόστομος, *i. e.* the golden-mouthed), the most renowned of the Greek fathers, was born of noble and very opulent parents, A.D. 354 (some writers say 344 and 347), at Antioch, the capital of Syria. In early life he lost his father Secundus, who was commander of the imperial army in that province; and his mother Anthusa, from the age of twenty, remained a widow, in order to devote herself wholly to her son's improvement and welfare. He was educated for the bar, and studied oratory at Antioch under Libanius, who declared him worthy to be his successor, were it not that the Christians had made him a proselyte. He was taught philosophy by Andragathius, and spent some time in the schools of Athens. After a very successful commencement of legal practice, he relinquished the profession of law for that of divinity. At this time the rage for monachism was extremely prevalent, and Chrysostom retired to a monastery in a mountain solitude near Antioch, where, in opposition to the pathetic entreaties of his mother, he adopted and adhered to the ascetic system with rigid austerity during four years. The manners and discipline of the anchorites with whom he associated resembled, as described by himself, those of the Essenes, in fasting, praying, reading, subsisting on vegetable food, maintaining silence and celibacy, and discarding all consideration of *meum* and *tuum*. (*Homil.* 72, *on Math.*, and 14, *on Timoth.*, tom. ii.) At the age of twenty-three he was baptized by Meletius, bishop of Antioch, after which he withdrew into a solitary cavern, where, without any companion, he spent about two years in committing to memory the whole of the Bible, and in severely mortifying his carnal affections. Having neither bed nor chair, he reposed suspended by a rope slung from the roof of his cave. The damp and unwholesome air of the place reduced him at last to so ill a state of health, that he was obliged to return to Antioch, where, being ordained a deacon by Meletius (A.D. 381), he commenced his career as a very eloquent popular preacher, and published several of his declamatory discourses and argumentative treatises. Five years afterwards he was ordained priest, and at the age of 43 was made vicar to Flavianus, successor to Meletius. His fame as a church orator was now so established, that, on the death of Nectarius, archbishop of Constantinople, he was enthusiastically chosen by the people and priesthood of the city to fill that important office. Chrysostom, on this and former occasions, appears to have reiterated with sincerity the *noli me episcopari*: however, by the mandate of the Emperor Arcadius, he was consecrated and enthroned A.D. 398 by Theophilus, patriarch of Alexandria, who afterwards proved to be one of the most envious and malignant of his enemies. Chrysostom bestowed upon the indigent the whole income of his large patrimonial inheritance; and with the revenues of his episcopal see he founded and endowed an hospital for the sick, which procured for him the appellation of John the Almoner. Several times a week he preached to crowded audiences, and his oratorical sermons were received by the people with such shouts and acclamations of applause, that his church became a sort of theatre, which attracted great numbers who had hitherto attended only the circus and other places of amusement.' The resolute and fearless zeal of Chrysostom in the reformation of clerical abuses, and in the denunciation of licentiousness among the great, soon began to draw upon him the enmity of a confederate party, whose bitter retaliation finally effected his banishment and death. Much is said by various writers both in commendation and reprehension of his character and conduct. The church historian Socrates describes him as being 'sober, temperate, peevish, irascible, simple, sincere; rash, rude, and imprudent in rebuking the highest personages: a zealous reformer of abuses; extremely ready to reprove and excommunicate; shunning society, and apparently morose and haughty to strangers.' Such qualities embroiled him in continual quarrels with the secular clergy, courtiers, and statesmen, and especially with the wealthy female devotees of luxury and fashion. He appears to have delighted in incurring the implacable hatred of rich young widows, by often reminding them of their paint and ugliness. His zeal for the promotion of his own sect was equalled only by his intolerance towards all others. He caused many temples and statues in Phœnicia to be demolished, and especially persecuted the Arians, refusing them the use of a church in the city, and parading in the streets Trinitarian singers of hymns, with banners and crosses, until the opposition vocalists fell to fighting and bloodshed. The vigour and perseverance of his efforts to reform the loose ecclesiastical discipline permitted by his indolent predecessor, occasioned the formation of a faction which sought to be revenged by his assassination. In his visitation in Asia, two years after his consecration, he deposed at one time no less than thirteen bishops of Lydia and Phrygia; and in one of his homilies (tom. ix., p. 29) he charges the whole episcopal order with avarice and licentiousness, saying that the number of bishops who could be saved bore a very small proportion to those who would be damned. It appears to have been a common custom at that time among the clergy to have each one or more young females residing with them, ostensibly for the purpose of receiving pious instruction as pupils. When therefore Chrysostom enjoined the discontinuance of this custom, as in all cases very questionable, and in many most evidently criminal, he at once excited in the hearts of a great portion of his clergy a personal animosity, very similar to the wrath of Achilles when deprived of his mistress. It has already been remarked that the vanity and vices of the female sex were a favourite topic of Chrysostom's impassioned declamation. In these invectives he used no reserve in reproving even royalty itself. The personal resentment and indignation of the beautiful and haughty Empress Eudoxia was probably therefore the real cause, as Gibbon suggests, of all the disasters by which he was henceforth overwhelmed; for she patronized the confederation which the deposed bishops formed with his adversary Theophilus, who assembled at Chalcedon a numerous synod, by which there were preferred against Chrysostom above forty accusations, chiefly frivolous and vexatious, which, as he refused to acknowledge himself amenable to such a tribunal, and made no defence, were subscribed by forty-five of the bishops present, who in consequence resolved upon his immediate deposition. He was therefore suddenly arrested and conveyed to Nicæa in Bithynia, A.D. 403. This Theophilus is described by Socrates, Palladius, and several others, as a bishop addicted to perjury, calumny, violence, persecution, lying, cheating, robbing, &c. After Chrysostom's banishment Theophilus published a scandalous book concerning him—a sort of collection of abusive epithets—in which Chrysostom is called a filthy demon, and is charged with having delivered up his soul to Satan. It was translated into Latin by the friend of Theophilus, St. Jerome, who joined in the abuse Chrysostom was the idol of the great

mass of the people. He was a pathetic advocate of the poor: his pulpit orations were calculated to excite their strongest emotions. When it was known therefore that their favourite preacher was banished, an alarming insurrection ensued, which rolled on with such fury to the palace gates, that even Eudoxia entreated the emperor to recall Chrysostom, for already the mob had begun to murder the Egyptian attendants of Theophilus in the streets. Only two days elapsed before Chrysostom was brought back to Constantinople. The Bosporus, on the occasion, was covered with innumerable vessels, and each of its shores was illuminated with thousands of torches. The archbishop however gained little wisdom from experience; for soon after, when a statue of the empress was set up near the great Christian church, and honoured with the celebration of festive games, he preached in very uncourteous terms against the ceremony, and compared Eudoxia to the dancing Herodias longing for the head of John in a charger. The result of this offensive conduct was the calling of another synod, which ratified the decision of the former, and again Chrysostom was arrested, and transported to Cucusus, a place in the mountains of Taurus. Another uproar was made by the mob, in which the great church and the adjoining senate-house were burnt to the ground. The death of Eudoxia shortly afterwards, and a tremendous storm of hailstones, were regarded by the people as the avenging visitation of heaven. A great number of the poorer class, who were always Chrysostom's most faithful adherents, refused to acknowledge his successor, and formed for some time a schism, under the name of Johannites.

Chrysostom bore his misfortunes with fortitude, and being still possessed of abundant wealth, he carried on very extensive operations for the conversion of the people about his place of banishment. His enemies soon determined to remove him to a more desolate tract on the Euxine, whither he was compelled to travel on foot, beneath a burning sun, which, in addition to many deprivations, produced a violent fever. On arriving at Comana, he was carried into an oratory of St. Basil, where, having put on a white surplice, he crossed himself and expired, September 14, 407, being about sixty years of age. Thirty-five years after his death and burial at Comana, his remains were brought with great pomp and veneration to Constantinople by Theodosius II. It is said they were afterwards removed to Rome. The Greek church celebrates his feast 13th November; the Roman, 27th January.

The works of St. Chrysostom are very numerous. They consist of commentaries, 700 homilies, orations, doctrinal treatises, and 242 epistles. The style is uniformly diffuse and overloaded with metaphors and similes. 'Chrysostom's peculiar talents were those of a declamatory preacher whose art lay in warming the passions, not in convincing the reason; and whose pompous style and rhetorical flourishes, instead of being adapted to a simple narration of facts, were apt rather to exaggerate facts into miracles.' (Dr. Middleton, *Mirac. Powers*, p. 72.)

Dr. A. Clarke, in his 'Succession of Sacred Literature,' vol. ii., has given a brief analysis of the principal treatises. He concludes by remarking, that in the works of Chrysostom there is hardly anything that favours the doctrines of the church of Rome; the opposite of which may be established by a very few examples. Chrysostom believed in the real presence of Christ in the eucharist, as a sacrifice (*Homil.* 24, *on Corinth.*); in the efficacy of prayers of and for the dead (*Homil.* 3, *on Philip.*): he states it to be one of the daily duties of a priest (*Six Books on Priesthood*) to pray for the dead. He often speaks of the miracles daily wrought by the relics of martyrs (ii., p. 555), by the sign of the cross (vii., p. 552; ii., p. 387; v., p. 271), and by consecrated oil (vii., p. 387). His belief in demoniacal possession and exorcism is shown in his 'Address to Stagirius.' His church was full of images and pictures (ii., p. 78).

The chief value of Chrysostom's works consists in the illustration which they furnish of the manners of the 4th and 5th centuries. They contain a great number of incidental but very minute descriptions that indicate the moral and social state of that period. The circus, theatres, spectacles, baths, houses, domestic economy, banquets, dresses, fashions, pictures, processions, chariots, horses, dancing, juggling, tight-rope dancing, funerals, in short every thing has a place in the picture of licentious luxury which it is the object of Chrysostom to denounce. Montfaucon has made a curious collection of these matters from his great edition of the works of Chrysostom, 13 vols. folio (editio optima). (*Mémoires de l'Acad. des Inscrip.*, vol. xiii., p. 474, and vol. xx., p. 197; also Jortin, *Eccles. Hist.*, vol. iv., p. 169, et seq.) The 'Golden Book' of St. John Chrysostom concerning the education of children, 12mo., p. 1659, is translated from a MS. found in the cardinal's library at Paris, 1656. The precepts are very curious. The boy is to see no female, except his mother; to hear, see, smell, taste, touch, nothing that gives pleasure; to fast twice a week, to read the 'Story of Joseph' frequently, and to know nothing about hell till he is 15 years old. Chrysostom is described by his biographers as being short in stature, with a large bald head, a spacious and deeply-wrinkled forehead, short and scanty beard, hollow cheeks and sunken eyes, having a look of extreme mortification, but in his movements remarkably brisk, energetic, and smart. He was strongly attached to the writings of St. Paul. His surname Chrysostom was not applied until some time after his death. The biographers of Chrysostom are very numerous: Socrates, lib. vi.; Sozomen, lib. viii.; Theodoret, lib. v.; *Vie de St. Jean C.*, by Hermant, 8vo., 1665; Menard; Erasmus; Du Pin; Tillemont; Palladius; Photius; Ribadeneira; Gibbon, c. 32; Moreri's *Dict.* contains a further list; Priestley, *Hist. Church*, vol. ii.; Usher, *Historia Dogmatica*, p. 33; six sermons have been translated by Rev. W. Scott; and the *Treatise on Priesthood* by Bruce, &c. There is a recent life of Chrysostom by Neander.

CHTHAM'ALUS. [CIRRHIPEDA.]

CHUB. [LEUCISCUS.]

CHUBB, THOMAS, was born in 1679, at East Harnham, a small village near Salisbury. His father, who was a maltster, died without property, and left his mother in indigence to provide for four children. Thomas, the youngest, after receiving a little instruction in mere reading and writing, was apprenticed to a leather glove and breeches-maker in Salisbury. He was afterwards, as a journeyman, engaged in the business of a tallow-chandler in the same city. In both these employments he continued to be more or less concerned until the end of his life; and it certainly is a proof of remarkable mental energy that, in the midst of duties so humble, and merely manual, he contrived, by unassisted application, to acquire a general knowledge of literature and science, and to become a distinguished writer on subjects of religious and moral controversy. The discussion which arose on the publication, in 1710, of the Arian work of Whiston on Primitive Christianity, induced Chubb to write his 'Supremacy of God the Father asserted;' consisting of eight arguments from Scripture, proving the Son to be a subordinate and inferior being. It was published in 1715, under the immediate superintendence of Whiston, and by opposite parties was equally extolled and condemned. Chubb replied to his Trinitarian opponents in 'The Supremacy of the Father vindicated.' In 1730 he published a collection of his occasional tracts in a handsome 4to. volume; containing, besides the two works just mentioned, thirty-three others on faith, mysteries, reason, origin of evil, persecution, liberty, virtue, governmental authority in religion, &c. Pope, in one of his letters to Gay, after speaking of Chubb as 'the wonderful phenomenon of Wiltshire,' says of this volume, 'I have read it through with admiration of the writer.' Among the eminent individuals who admired the writings of Chubb, and sought to be of service to him, was Sir Joseph Jekyl, master of the rolls (the early patron of bishop Butler), who appointed him steward, or supervisor, of his house in London; an office of which the duties appear to have been as little suited to the character of Chubb as those of a tallow-chandler. Accordingly some of the witty adversaries of Chubb made themselves extremely merry with the grotesque appearance of his short and fat figure as he officiated at his patron's sideboard, adorned with a powdered tie-wig and a dress-sword. After a year or two he relinquished his stewardship, returned to Salisbury, and to the last 'delighted in weighing and selling candles.' (Kippis's *Biog. Brit.*). His next publications were 'A Discourse on Reason, as a sufficient guide in matters of Religion;' 'On Moral and Positive Duties, showing the higher claim of the former;' 'On Sincerity;' 'On Future Judgment and Eternal Punishment;' 'Inquiry about Inspiration of the New Testament;' 'The Case of Abraham;' 'Doctrine of vicarious Suffering and Intercession refuted;' 'Time for keeping a Sabbath;' and several other tracts upon interesting points of religious dispute. In 1738 appeared his

True Gospel of Jesus asserted.' Chubb would explain what the Christian gospel is, and what it is not: he shows therefore that, as it is said to have been preached to the poor by the founder of Christianity himself and his disciples, antecedently to many transactions of his life, and of course to the events of his death, it could not be a history of his own actions and final sufferings, but was the doctrine of moral reformation which he announced as a rule of conduct, and consequently that the several historical accounts of those transactions and events, with the doctrines founded thereon, are not the gospel, nor any part of it; and, moreover, that nothing is so entirely foreign to its nature and object as the subsequent establishment of state hierarchies, and the metaphysical subtleties since introduced by the political managers of Christianity. In the following year, 1739, Chubb put forth a vindication of this work, and of the discourse annexed to it, against the doctrine of a particular Providence. The following are some of the answers of his opponents: 'Confutation of Chubb's True Gospel,' by the Rev. Jos. Hallett; 'Remarks on Chubb's True Gospel,' by the Rev. George Wightwick, 1740; 'Answer to Chubb's True Gospel,' by a Sufferer for Truth; 'Letter to Chubb on his True Gospel,' by Richard Parker, 1739; 'Remarks on Chubb's True Gospel, and Discourse on Providence,' by the Rev. Caleb Fleming, 1738; 'Remarks on Chubb's Vindication of his True Gospel,' by the Rev. C. Fleming, 1739. To these Chubb replied in his 'Enquiry into the Grounds and Foundation of Religion,' 1740; in which he advocates the priority of a natural religion. This occasioned 'A Vindication of Revealed Religion,' in answer to 'Chubb's Grounds,' by John Phelps, 1740. In 'A Discourse on Miracles,' published 1741, Chubb contends that they furnish no proof of divine revelation. This discourse elicited 'Animadversions on Chubb's Discourse,' by the Rev. C. Fleming; and 'Examination of Chubb's Discourse,' by a Layman, 1742. 'An Enquiry concerning Redemption,' in 1743, and 'Four Dissertations,' in 1746, on portions of the Old Testament history, were the final works of Chubb. The last was answered in 'Truth and Modern Deism at variance, shown by a careful Examination of Chubb's Four Dissertations,' by the Rev. C. Fleming, 1746. In February of the same year, Chubb, according to his desire, died suddenly at the age of 68, as he sat in his chair. Though he left several hundred pounds, his income was to the last so scanty, that it is said he often thankfully accepted from Cheselden, the eminent surgeon, the present of a suit of left-off clothes. His posthumous works, consisting of numerous tracts similar to those already mentioned, were published in 2 vols., 8vo., 1748; and were answered by Fleming, his indefatigable opponent, in 'True Deism the Basis of Christianity; or, Observations on Chubb's posthumous Works.' Dr. Leland, in his 'View of Deistical Writers,' vol. i., has devoted above 80 pages to remarks upon them. For notices of Chubb, see also bishop Law's 'Theory of Religion.' The writer of the article in Chalmers's 'Biographical Dictionary,' in accordance with the proverbial uncharitableness of that work, considers Chubb as an impious and contemptible writer, and wonders how Dr. Kippis could admit the elaborate account of him which occupies twelve folio pages of the 'Biographica Britannica.' The truth is, that, with an occasional blunder, arising from an ignorance of the Greek and Hebrew languages, the writings of Chubb, in following the metaphysical school of Dr. Clarke, exhibit a great argumentative skill, and a style remarkable for a temperate and critical propriety, and a pleasing fluency. The sentiments of liberality and benevolence which pervade his writings, with the zealous endeavour to promote the cause of civil and religious liberty and rational improvement, confirm the opinion which is given of their author by the amiable writer of 'John Buncle,' Mr. Amory, who says, 'I knew him well; he was a sincere good man as ever lived.' The publication, by one of his friends, of 'A Short and Faithful Account of the Life and Character of the celebrated Mr. Chubb,' 1747, drew forth from the Rev. Mr. Horler, of Winchester, a specimen of the most revolting scurrility, entitled 'Memoirs of Mr. Chubb; or, a fuller and more faithful Account of his Life, Writings, Character, and Death,' 1747. The author, after asserting, without the slightest evidence, that Chubb was addicted to the most abominable vices, declares that he would have his corpse, and that of every similar sceptic, instead of being decently buried, 'dragged by a halter round the neck to a gibbet, where the hangman having cut out the heart, plucked out the tongue by the roots, and chopped off the right hand, should burn the whole in a fire made with the books which he wrote; and his ashes being thrown into the air with execration and contempt, would make all those who bow the knee at the name of Jesus, lift up their heads with joy and great gladness.' This work produced 'A Vindication of the Memory of Mr. Chubb from the scurrilous and groundless Calumnies of a late infamous Libel;' 1747. All the above-mentioned works are in the library of the British Museum.

CHUDLEIGH. [DEVON.]

CHUMPANEER, a subdivision of the province of Guzerat, situated between 22° and 24° N. lat., and between 73° and 75° E. long. It is bounded on the north by the river Mahy or Mhye; on the south by the Nerbudda; on the east by Malwa; and on the west by the district of Baroach. This territory is principally possessed by the British government and the Guicowar, but on the decline of the Mogul empire, some portion, including the town of Chumpaneer, fell into the hands of the Mahrattas, and there are besides a few petty chiefs, or Rajahs, who acknowledge a limited kind of dependence upon the actual possessors of the sacred mountain upon which the antient town and fortress of Chumpaneer were built. This mountain rises out of an extensive plain to the height of about 2500 feet. Chumpaneer is described by Abul Fazl 'as a fort upon a lofty mountain, the access to which, for upwards of two cose, is exceedingly difficult, and there are gates at several parts of the defile.' The cose is explained by the same author 'to consist of 1000 steps made by a woman carrying a jar of water on her head and a child in her arms.' At the northern base of the mountain are the remains of a city, supposed to have been the capital of a Hindoo principality before the Mohammedan invasion. The city was taken in the year 889 of the Hegira, answering to 1485 of the Christian æra, by Mahmood, the Mohammedan ruler of western Guzerat. Half a century later it was taken by the emperor Humaiyoon, and when described as above by Abul Fazl in 1582 consisted principally of Hindoo and Mohammedan ruins. The town does not contain at present more than between 200 and 300 inhabited houses, but the ruins of antient buildings extend for several miles on each side of the mountain: there are two forts on the mountain; the upper one is considered to be of great strength.

(*Ayin-i-Akbari; Report of Committee of House of Commons of* 1832, political division.)

CHUQUISACA. [BOLIVIA.]

CHUQUISACA, the capital of Bolivia, in South America, is situated near 19° S. lat., and between 64° and 65° W. long. It lies in one of the valleys which descend from the eastern declivity of the eastern chain of the Bolivian Andes, at an elevation of about 14,700 feet above the level of the sea; to which circumstance its delightful climate must be ascribed. This valley contains the Cachimayo, a tributary of the Piciomayo, which is a branch of the Paraguay river. The town, which was formerly called Charcas, or La Plata, and, at a certain period of the war with the Spaniards, Sucre, from the name of the general who gained the victory of Ayacucho, is on the whole well built, and has a magnificent cathedral, with large towers rising from each angle. There are also several churches and convents, with domes and steeples, which from a distance give it the appearance of a large town. But the place is of moderate extent, having only a population of 26,000. It has an appearance of neatness and cheerfulness, not very common in the towns of South America. Since it has become the seat of the legislature and government of the republic, great changes have been effected. The palace in which the archbishop of Charcas once resided has been assigned to the president of the republic. Some of its well-built convents have been converted into institutions of education, one having been given to the university, and another turned into a mining-school and a college of arts and sciences, both of which were founded in 1826. (General Miller; Temple.)

CHURCH, or KIRK, which is precisely the same word in a varied orthography, is supposed to be the Greek word *κυριακός* (kuriakos), a derivative of *κύριος* (lord), one of the designations of Jesus Christ, the founder of the Christian system. It is one of the Saxon adoptions from the Greek. Κυριακός is an adjective, and we must understand after it some word denoting flock, or house, the Lord's flock, the

Lord's house; the two senses in which kirk, or church, is used.

Of church, as denoting an edifice appropriated to Christian purposes, we treat in a separate article. We have now to speak of it as a term used to designate bodies or communities of men, when contemplated under the aspect of being persons who are followers of the Lord Jesus Christ. We shall endeavour to exhibit and illustrate the various senses in which it is used with as much completeness as our limits will allow. The word church has been used from the most remote period to represent the Greek term ἐκκλησία (Ecclésia), which often occurs in the New Testament, which was adopted into the Latin language without any change, and which gives us our words ecclesiastics and ecclesiastical, which correspond to the Saxon terms churchmen, and of churchmen. The meaning of the word *ecclesia* among the classical Greek writers is 'meeting or assembly,' and in this or the somewhat modified sense of 'community' it was adopted by the writers of the New Testament.

The whole community of Christians thus constitute the church. This is the sense in which the word is most commonly used in the New Testament: as when it is said that 'the Lord added daily to the church such as should be saved' (Acts ii. 47); 'Head over all things to his church' (Eph. i. 22); 'concerning zeal, persecuting the church' (Phil. iii. 6): and when our Lord said, 'Thou art Peter, and on this rock I will build my church' (Matt. xvi. 18), he contemplated that majestic assembly, the multitude, whom no man can number, who in ages to come should form the great Christian community. And as, when thus used by the Apostles, it comprehended all the disciples of Christ, without regard to questions which divided the opinions of Christians even in the earliest times, so it is still often used to denote the whole body of Christians, notwithstanding any peculiarities in their church-order and ritual, or however they may understand the instructions on some points of Christ and the Apostles.

But it soon came to be regarded as essential to the idea of a church that the believers should be bound together by a species of mutual pledge, and form a compact and united body. Certain outward forms of profession came to be regarded as requisite for every member, such as baptism, and partaking in the Lord's Supper; certain officers, as bishops, pastors, and deacons, were regarded as essential; as well as certain uniform services, and the acknowledgment of certain propositions as containing a just exposition and summary of the doctrine of Christ and the Apostles. A continued effort seems to have been making from a very early period in the history of Christianity to bring the body of professing Christians into this state of consistency and uniformity. And to give the greater effect to the effort, the bishop of Rome, who was represented as the direct successor of St. Peter, the rock on whom the church was to be built, received by almost universal consent a kind of headship, or supremacy, and about him was gathered a council, consisting of other bishops, pastors, and deacons, forming a supreme authority in this compact community, and a court of ultimate appeal. Nearly the whole body of professing Christians in the states of western Europe were, by various means, brought to enrol themselves in this great confederacy, and they formed for many ages the church, a numerous and in the main a well-ordered and well-governed community.

At the Reformation, certain states of Europe separated themselves from this great community of Christians. The separation was made on various grounds: objections to the tyranny of the ecclesiastical authorities; to their exactions; to their assumption of powers not sanctioned by reason or Scripture; to the corrupt lives of some of the persons near the head of the church; together with an opinion that the ceremonies enjoined in the rituals were superstitious, if not idolatrous; and that many things were taught to the people as Christian verities which not only had no countenance from Scripture, but which were opposed to the plain teachings of Christ and the Apostles. Many of the more learned and more virtuous reformers did not look to the breaking-up of the church, but to the reformation of it in doctrine and discipline, leaving the community of believers in the compact and, in the main, beautiful consistency and order in which they found them. But the resistance which was made to the efforts of the reformers, combined with other things, rendered this impracticable, and nothing remained for the states in which the call for reformation was the loudest, and where a strong sense of the corruption of the Roman Catholic system had possessed the minds both of rulers and people, but to break off from the great confederacy, and to renounce entirely all connection with and all spiritual allegiance to the pope, the great head of the church. Hence arose another use and application of this term *church*, and we hear of the church of Geneva, the church of Scotland, and the church of England, meaning the Christian members of those political confederacies, or belonging to those nations, when regarded under the aspect of being professed believers in Christ.

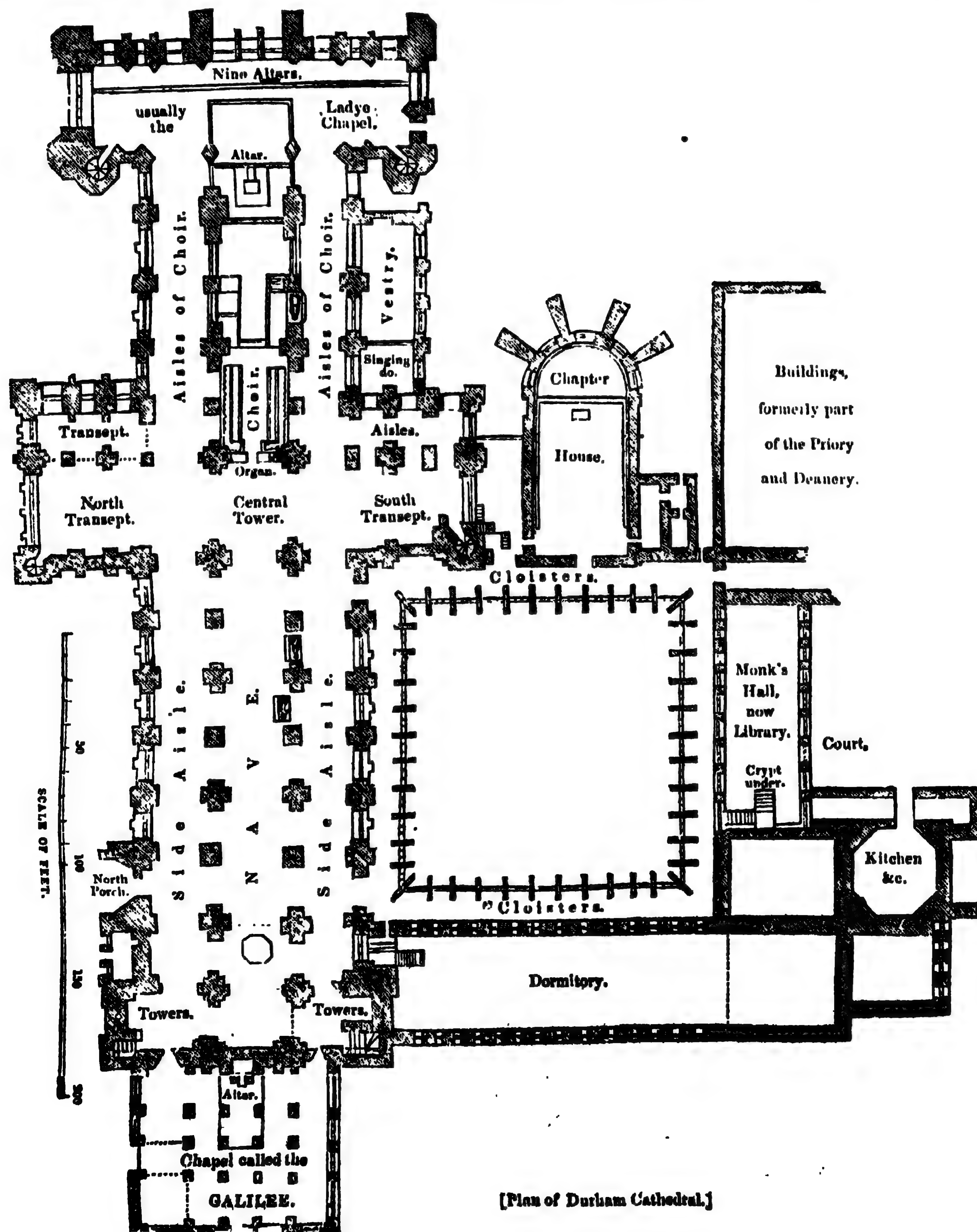
The expediency and the right of particular nations thus to detach themselves from the great community of Christians, and to establish churches of their own, have been the subject of controversy. The Protestant, however, regards the point as settled, and in each of the three states above mentioned, as well as in other Protestant states of Europe, there are *national churches* established, founded on the public law, and regulated by the same public will which regulates affairs purely political and secular. Those national churches of Protestantism vary among themselves on almost every point both of order, ritual, and doctrine, according to the peculiar opinions of the persons who happened to possess the chief influence at the time when the new faith, form, and order were established, or who at a somewhat later period had influence sufficient to modify the church in any of those points. Hence there is no common church of Protestants. Each Protestant nation has its own church, and regulates its own spiritual affairs without communication with other Protestant people. It is a system of national independency. These national churches, however, are not found to comprehend all persons who in their political character are members of the respective nations. In the English, the Scottish, and other Protestant nations, there are many persons who continue to profess that they adhere to the antient and great community, that they are members of the Christian church in the second of the senses of which we have spoken, and who abstain from connecting themselves in any manner with the national church, having their own system of faith, worship, and order as a branch of the great catholic or universal church. Again, there are a great multitude of Protestants who do not regard themselves as members of the church of England or of the church of Scotland; some who object to the frame and order of the church as in England being episcopal, and in Scotland being presbyterian; some who have scruples respecting points in the public service book of the church of England; some who regard the Articles of Faith as not presenting a just view of the doctrine really taught in Holy Scripture; some who think that the church as at present constituted does not leave the ministers sufficiently at liberty for the influential performance of their duties; and some who think that practically the system is not favourable to the prevalence of Christian influences, which they regard as the main object in every appointment connected with the church. We touch but upon the broad and leading objections. But there are many also who separate themselves from the national union because they object to the principle of a national church. They contend that there should be no such church regulated by councils and parliaments, but that the believers in Christ should be left at entire liberty, each person for himself to connect himself with others, if he see proper to do so, and thus to form Christian communities on principles and for purposes such as each individual might approve for himself. The Congregationalists or Independents of England, the most numerous class of English dissenters, in the declaration of their faith, church order, and discipline, issued by authority in 1833, avow the principle that each society of believers associated together for religious purposes is properly a Christian church. The question about which there has been so much disputation, of the union of church and state, is in effect, and when stripped of its abstraction and its personification, nothing more than the question whether there shall be a union of the people of each nation in one Christian society, the affairs of which are regulated by the national will as that will is collected on other subjects; or, whether there shall be no expression of a common will, but each person be left to receive or neglect Christianity, and to make his public profession of it in whatever way seems to him to be best. Our limits do not allow us to enter into the discussion of this question, but we may state the main arguments briefly thus:—In behalf of a national church it is contended that

without some public provision there would soon be many parts of the country without Christian ministrations at all; that by securing an order of well-instructed ministers, there is the best preservative that can be devised against the prevalence of injurious superstition and dangerous errors; that affairs of such importance as these should be subjected to the consideration and direction of the enlightened mind of a people; and that practically from the moment that property is acquired by any body of professing Christians, that body must become amenable to the state, must apply to the state for direction whenever questions arise respecting it, so that it is in fact impossible entirely to disjoin affairs of religion from affairs of state. On the other hand, it is contended that to set up articles of faith and forms of worship is an injurious invasion of the rights of Christians; that to connect the profession of particular opinions with temporal advantages is unfavourable to the progress of inquiry and of truth, and has a tendency to produce simulation in Christian ministers; that the system leads to political subserviency, and fosters a worldliness of spirit; and that practically the system is not acceptable to the nation, as is evinced by the multitude of the persons who, notwithstanding the losses and inconveniences to which in consequence they subject themselves, yet do not belong to the church.

The Methodists do not, we believe, speak of themselves as a church; but their system is in all its great features that of a Presbyterian church.

We have now gone through the principal senses in which this term *church* is used when it is applied with any propriety. But we cannot conclude without noticing one other sense in which the word is often used, and we notice it to condemn it as mischievous, and in every point of view incorrect and improper. We mean when *church* is used to denote *the officers of the church*, the bishops, priests, and deacons; a use of it neither sanctioned by etymology nor the usage of primitive times, and which is calculated greatly to mislead, as things which are predicated, and truly predicated, of the church in its proper sense of a community of believers in church order, and appointed with proper church officers, may be transferred inadvertently to *church* when it is the officers only who are meant. 'The interests of the church,' for instance, a very common phrase, are properly the interests of the great English community looked upon in the aspect of its relation to Christianity, not the interests of the officers or ministers only. Their proper designation is not the church, but the clergy.

CHURCH. An ecclesiastical edifice, sometimes built after the model of a modern basilica, and sometimes in the form either of a Latin or a Greek cross. The basilica form however must be considered as belonging to the churches



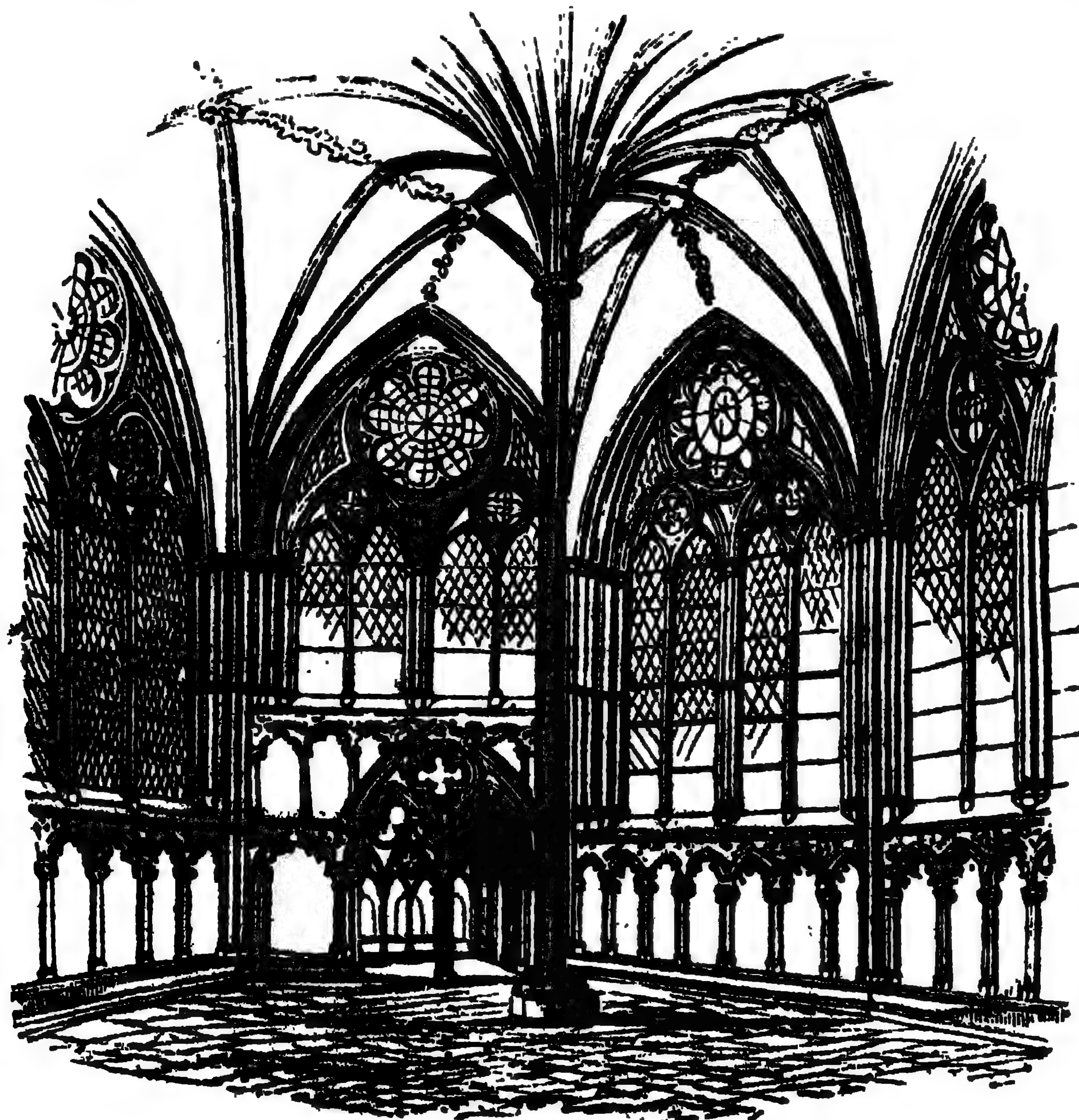
[Plan of Durham Cathedral.]

of the early Christians. The origin of the difference between the form of the Latin and Greek cross belongs to the period of the schism in the church. The Latin was in common use until the Reformation. Some resemblance to the basilica form may be traced in modern churches erected since the Reformation to the present day. The most perfect resemblance to the church basilica is observable in the cathedrals of Europe, and especially in England. Attached to these edifices there are still many of the various buildings which formed the monastic establishments of former days. A church or cathedral with a Greek cross has the transept as long as the nave and choir: the greater part of the Greek churches are built in this form. The Latin cross has the nave much longer than the transepts and choir. Many of our modern churches consist of only one long nave, with an altar at the east end: the cross form, or transept, is in some instances scarcely perceptible, and in others entirely omitted. In the nave of the church, towards the east end, are placed the pulpit and reading-desk, sometimes on one side, and sometimes in the centre of the nave. A sounding-board is often constructed over the pulpit in order to assist the voice of the preacher. The altar end of the church is raised by a step or steps, and is enclosed. The font is sometimes placed near the entrance and at others near the altar: and the stoups, or small stone basins, set in niches and originally intended for holy water, are often seen in village churches. At East Dereham these stoups are on the exterior of the porch. Near the altar in antient churches there are sometimes three niches with seats in them raised each a step above the other.

Churches are of five classes, metropolitan, cathedral, collegiate, conventual, and parish churches. The term cathedral is derived from καθέδρα, 'a seat,' from the seat or throne of the bishop being placed therein. Cathedrals are the chief ecclesiastical structures of the dioceses in which they are situated.

Almost every cathedral is varied in plan, although the leading features, the nave and choir, are found in almost all. The plan usually consists of a galilee, or chapel, at the principal entrance; the nave, or main body of the church; the side aisles, which do not rise so high as the nave, and are placed on each side of the nave, sometimes with chapels, at other times without, between the openings formed by the windows: the choir, or place for the ceremonies of the church: the transept, or division at right angles to the end of the nave next the choir, which projects on each side, and forms a cross on the plan. Some cathedrals have a double transept, and the transepts have often aisles. At the end of the choir is the high altar, behind which is usually a ladye chapel, or chapel to the Virgin. The choir end of a cathedral is sometimes terminated by an apsis, or semicircular end. The term apsis was originally applied to the whole choir, or part railed off from the nave, like the end of a church basilica. Along the sides of the choir are ranged richly-carved seats, ornamented with arches, pinnacles, and tracery, carved in oak. The bishop's seat, richer than the others and raised above them, is on one side, at the eastern end. The choir has also side aisles. Cloisters and a chapter-house are usually attached to English cathedrals, but the latter are rarely met with on the continent, the chapters being usually held in the cathedral, or in a chapel within the cathedral or abbey. The minor parts of a cathedral are the muniment room, the library, the consistory court, the vestries of the dean and chapter, minstrels' chapels, a font, and a minstrel's gallery.

Beneath the body of the cathedral there is usually a crypt, or low basement, supported on arches springing from thick columns, as in Canterbury cathedral and others. Both externally and internally the antient cathedrals of England, France, and Germany display all the luxury of Gothic architecture. Like all ecclesiastical buildings, they stand with the altar towards the east, and the principal entrance to the west; the transept is placed north and south. At the point of intersection of the transept with the nave there is usually a lofty tower, sometimes surmounted by an elegant spire, as in Salisbury cathedral. Sometimes the principal or western front has a tower at each angle, which in some instances are also terminated with spires. The nave of a Gothic cathedral is supported by clustered columns, arched from one to the other, over which there is usually a row of small arches forming a gallery, which is called the *triforium*, and above are windows called clere-story windows. The aisles are lighted by windows placed between the openings of the arches of the nave; and, externally, the buttresses of the aisles often rise, supported on an arch, to the wall of the nave: these are called flying buttresses. The exterior walls of the cathedral, with its towers, are generally decorated with buttresses, surmounted with pinnacles; and between the buttresses are the openings or windows of the nave and aisles. The ceiling of the nave is sometimes of stone, and covered with tracery formed by the intersection of the arches which spring from the clustered columns of the



[Chapter-house, Salisbury.]

nave. The west or principal front is usually the most highly decorated with tracery, pinnacles, and sculptured figures. In the side aisles, and the aisles of the choir, there are often chapels richly designed, which contain the tombs of the founder, &c. Our cathedrals abound with monuments of various epochs, from the early Norman period of our history to the present time. The chapter-house and cloister are large and important features in many of our cathedrals. The finest chapter-houses in England are of a polygonal form on the plan, with a seat running round from the entrance, and the interior decorated with sculpture, and in some instances with painting. In some chapter-houses a column, or cluster of columns, rises from the centre of the room, from which spring the sides of pointed arches, meeting the other halves of pointed arches rising from the column or columns at the angles of the walls.

The chapter-house of Salisbury cathedral contains some of the finest specimens of the kind of sculpture usually found in such buildings.

The cloisters are rectangular enclosures, with a richly-ornamented and arched gallery running round the sides, and a wall forming the back of the enclosure: the arches, which are filled with tracery, look into an area, where probably the monks were formerly buried. There are also cloisters in some of the colleges of Oxford and Cambridge. The cloisters seem to be very similar to, and perhaps derived from, the crypto-porticus of antiquity. [CHALCIDICUM.] The Campo Santo at Pisa appears to have been originally a large cloister, similar to our cathedral cloisters. This part of the ecclesiastical structure may have been used not only for exercise, but for study. In England the cloisters were probably glazed: in Italy they are often decorated with frescoes, by celebrated masters. Chantries, or chapels for singing mass, were formerly founded by the pious for the benefit of their souls. They are often placed between the pillars of the nave, as the chantry of Cardinal Beaufort at Winchester: the effigy was also placed within the chantry. Some are complete chambers formed in the aisle of the choir as at Ely, and others are independent of the cathedral, as at Westminster. In some antient and modern cathedrals and large churches the principal feature is a dome, as St. Sophia's at Constantinople, St. Paul's, London, St. Peter's at Rome, and St. Mark's at Venice, Santa Maria de' Fiori at Florence, the Pantheon at Paris, and many others.

Some parish churches have very much the form of a cathedral, as Christ church, Hants. The chancel of a church, which is often the property of a layman, corresponds in situation to the choir of a cathedral, and, like it, is railed off from the body or nave of the church. [CHANCEL.] The chancels of our churches often contain the monuments of individuals connected with English history and literature, as at Arundel church, and Stratford-upon-Avon. In parish churches however the great tower is seldom placed at the intersection of the nave and transept, but forms the entrance at the west end, and contains the belfry. One of the most antient and best preserved parish churches in this country is St. Cross at Winchester. Norfolk and Suffolk possess many fine churches, some of which are remarkable for the lightness of their construction. (*Views of Collegiate Churches*, by J. P. Neale; Ferrey's *Christ Church, Hants.*)

The antient cathedrals of England are Bristol, Chichester, Canterbury, Carlisle, Chester, Durham, Ely, Exeter, Gloucester, Hereford, Lichfield, Lincoln, Norwich, Oxford, Peterborough, Rochester, Salisbury, Wells, Winchester, Worcester, and York. St. Paul's, London, is modern. Besides these there are several edifices, called minsters, which possess a cathedral character both in their construction and in their uses, as Westminster, Boverley-minster, and Lichfield and York cathedrals, which still retain the name of minster. Abbey churches had also a cathedral character.

The cathedrals of Norwich, Westminster, Canterbury, Peterborough, and Gloucester, have a semicircular apsis.

Ely has a centre tower and lantern 170 feet high, and a fine tower at the western entrance, much higher: it had two towers at the angles of the western entrance, but only one remains. The style of the building externally is Norman and early English. The nave is a beautiful specimen of the Norman style, the elevation consisting of three tiers of arches, with long clustered shafts round each pier. The elevation of the choir internally presents a superb design of decorated English. It was erected, with the equally beautiful chapel of St. Mary, between the years 1321 and 1349. The tower and lantern, supported on eight large piers, were unique until the erection of St. Paul's. Ely lantern is said to have suggested to Sir C. Wren the idea of the lantern over the dome of St. Paul's. This cathedral has the ladye chapel at one side, and not at the east end.

Salisbury is in many respects one of the finest English cathedrals, and the most uniform in style. It has two transepts. The ladye chapel has been, perhaps injudiciously, thrown into the choir. There is a porch entrance on the north side, leading into the nave. The cloisters, which are very extensive and magnificent, lead into a very elegantly-designed chapter-house. There is a small muniment-room attached to the south end of the second transept. The tower is supported by four massive piers, surrounded with smaller columns: the tower is surmounted by a spire; the whole height is 404 feet. This spire was added some time after the tower was finished; and the weight of it has considerably warped the piers, in consequence of which the summit of the spire is near two feet out of the perpendicular.

Hereford cathedral has a nave, side aisles, a north porch, two transepts, a choir, a ladye chapel, cloisters, and a chapter-house. The nave and chapter-house are in ruins. The architecture of the nave is Norman. The east end is built in the early English style. Underneath the ladye chapel is a crypt; and at the intersection of the nave there is a very large square tower.

Worcester cathedral is very similar in plan, having two transepts, but no side aisles to the larger transept which intersects the nave. The chapter-house and cloister are situated like those of Hereford; and at the intersection of the nave there is a handsome tower. The interior of the nave is in the early English style. The chapter-house is in the Norman style.

Wells cathedral, in plan, differs very much from all the rest. The chapter-house is on the north side of the church; the cloisters are in the usual place, the south, but they have only three sides; the entrance to them is from under the south-western tower of the cathedral. Here we have two western towers, a north porch, and a transept, with side-aisles; and at the end of the choir a very elegant ladye chapel, with a termination at the east end, somewhat similar to the apsis of a basilica. The architecture of the nave is early English: the towers appear to be much later in style. There is a crypt under this cathedral.

Exeter cathedral, founded in 932, rebuilt in 1112, has a chapter-house, used as a library, in the form of a parallelogram, unlike the usual form, which is polygonal. The cloisters of this cathedral were destroyed during the Commonwealth. The singularity of the design of this edifice consists in its having two towers, in the Norman style, one at the north and the other at the south end of the transept. The nave is very fine, and in the early English style.

Bristol cathedral, founded about 1142, is inferior to many others: it is irregular and imperfect in the plan, being without a nave. There is however some curious Norman work in the chapter-house.

Peterborough cathedral, rebuilt 1117, is on the plan of a simple Latin cross, with one large and two small towers at the western end, terminated with spires. The altar end of the choir has the termination in the form of the antient apsis: the ladye chapel is behind the altar. The transept has side-aisles and a tower at the intersection with the nave. The west end is remarkable for three large arches, under the centre of which is a small porch, with a library over it. The style of this cathedral is partly Norman, mixed with early English. Some parts are of a later date, as the east end, which is in the perpendicular style, or that kind which has been termed Tudor.

Gloucester cathedral, rebuilt 1089, differs from the preceding. The apsis is very large: attached to this part of the building, and at the entrance of the side-aisles, are chapels: the ladye chapel extends backwards. The chapter-house and cloisters are on the south side. On the north side of the cloister is a projection called a lavatory. On the south side there is a beautiful porch. An elegant tower, in the perpendicular style, rises from the intersection of the nave and transept. The walls and columns of the nave are in the Norman style.

Oxford cathedral has a short nave, a choir, a north transept, with an aisle, longer than the south transept, which is

without aisles. Two large chapels on the sides of the choir cloisters, and a rectangular chapter-house, are attached on the south side.

Hereford cathedral has an aisle, a north porch, double transepts, a choir, ladye chapel, cloisters, and remains of an octangular chapter-house.

Carlisle cathedral, formerly a priory, is small, and inferior to the other cathedrals.

Chichester cathedral has a nave, side aisles, transept, a choir, ladye chapel, now a library, and an irregular enclosed cloister. There is also an isolated bell-tower, like the Italian campanile in principle. This cathedral has an elegant spire.

Chester has a nave, side-aisles, and south transept, now a parish church; a choir and ladye chapel at the east end; a cloister to the north, and a rectangular chapter-house, and school-room, to the north of the cloister.

Lichfield has a nave and choir, nearly the same length; a ladye chapel, with a semi-octangular head or apsis; an aisle on one side of the transept; and a chapter-house with parallel sides terminated at two ends with semi-octangular figures.

Canterbury has a nave, and a cloister on the north side leading to the chapter-house, which is in the form of a parallelogram; double transepts, choir, and side chapels. At the end of the choir is an elegant chapel, with an apsis, and a circular chapel beyond, called Becket's Crown. The font is in a circular chapel, leading from the north transept. To this building is attached a library. The crypts underneath the entire cathedral are the finest in the kingdom. There are three towers, one in the centre, and two at the west end.

York is on a very elegant plan. The transept has double aisles; there is an elegant octangular chapter-house leading from the north transept, a superb centre-tower, two western towers, a record-room, and consistory-court. There is also a small crypt.

Winchester has a regular plan: the cloister was rectangular, but both it and the chapter-house have been destroyed. The transept is remarkable and unique, on account of the aisles running round the three sides. A small ladye chapel is attached to the east end, and there are extensive crypts under the cathedral.

Lincoln has a nave, a choir, and double transepts. Behind the choir is a place called the Presbytery: a small galilee is attached to the south transept. The cloister, which is comparatively small, leads to a magnificent chapter-house, of a polygonal figure, ten-sided, with flying buttresses. The western transept has aisles, and a large tower at the intersection with the nave. At the west entrance there are two smaller towers. Lincoln cathedral is very perfect.

Norwich has a long nave, and one transept; the east end is terminated by an apsis, beyond which there is a ladye chapel, and at the side of the apsis two chapels, formed by two segments of a circle. Attached to the side-aisle of the choir is a consistory-court. There are large cloisters on the south side of the edifice. The chapter-house has been destroyed.

Worcester cathedral has a nave and side-aisles, north porch, double transepts, choir and side-aisles, and a ladye chapel. On the south are the cloisters and king's school, and a chapter-house, circular within, and polygonal on the outside, with a column in the centre, as at Lincoln and Salisbury.

Westminster has a long nave and transept, with double aisles, an apsis at the east end of the choir, with four semi-polygonal chapels round it: beyond is the sumptuous ladye chapel built by Henry VII. The cloisters are to the south, as well as the chapter-house, an octangular building; beyond are some smaller cloisters connected by dark passages with the great cloisters. (See the plan in the *History of St. Peter's Church, Westminster*, by J. P. Neale.)

Rochester has a nave and side-aisles, a double transept, but on the north side of the choir only, a choir, and a chancel at the end of it. The chapter-house is at the south-east, and in form is a long parallelogram. A low tower rises from the intersection of the transept and nave, and on the west is a chapel.

Bangor cathedral consists of a choir, nave, transept, aisles, and a quadrangular tower at the west end. The clere-story windows are circular: those below are pointed.

Bath abbey, now a cathedral church, is in the form of a cross, making two small transepts without aisles; a small vestry is attached to the south transept, and a great tower rises at the intersection of the transept. The choir is the same width as the nave.

The cathedral of St. David's is partly Norman and partly of the pointed style. It consists of a nave, choir, transepts, side aisles, and a western tower. For a brief account of the cathedral of St. Asaph, see St. Asaph's.

A comparison of the principal Measurements of the English and Welsh Cathedrals, except St. Asaph's and Llandaff.

Cathedrals.	Extreme length.	Extreme breadth.	Height of chief tower and steeple.	Length of Nave.	Breadth of Nave.	Height of Nave.
	Feet	Feet.	Feet.	Feet.	Feet	Feet.
Canterbury .	545	170	230	178	27	80
Carlisle . .	242	130	123	110	34	73
Chester . .	375	200	127	120	41	..
Chichester .	410	151	300	146	26	65
Bristol . .	203	127	133	..	..	..
Bath . . .	240	257	..	111	37	..
Bangor . .	223	96	60	141	..	34
Durham . .	507	194	210	203	37	69 6 in.
Ely . . .	535	190	266	203	30	76
Exeter . .	408	155	133	96	31	66
Gloucester .	427	154	223	160	33	68
Hereford . .	350	174	160	125	28	63
Lichfield .	403	177	252	143	26	58
Lincoln . .	505	242	264	176	37	81
Man . . .	125	73	..	60	30	..
Norwich . .	415	200	309	205	28	75
Oxford . .	164	116	145	61	22	45
Peterborough	480	198	143	234	35	73
Rochester .	383	170	156	140	32	55
Salisbury . .	474	230	404	196	32	81
St David's .	..	..	..	124	..	..
St. Paul's . .	512	283	360	170	39	90
Wells . .	415	155	165	164	32	68
Winchester .	556	230	148	240	32	78
Worcester .	425	145	193	174	30	67
Westminster .	530 9 in.	220	225 4 in.	154	30	105
York . . .	518	241	200	210	43	93

The above are taken from Britton's 'Architectural Dictionary;' Neale's 'Westminster;' Browne Willis's 'Survey of the Cathedrals,' and 'History of the Mitred Parliamentary Abbeys;' and Dugdale's 'Monasticon.' For more minute admeasurements, see the works quoted at the end of this article.

The numerous cathedrals of France, Italy, and Germany present beautiful specimens of architecture, not only in the Gothic style, but also in the Italian style. The cathedrals of Amiens, Beauvais, Nôtre Dame de Paris, as well as others, are beautiful examples of Gothic. Cologne, and Freiburg, in the Breisgau, are equal if not superior to any cathedral in England. The cathedral, or Duomo, at Padua is partly in the Italian style, and the western front, though perhaps not in correct taste, produces a masterly effect. St. Peter's is the largest cathedral in Europe. Vienna and Strasburg have the highest spires; the former is 465 feet, the latter 456 feet high. (For information on English cathedrals we must refer the reader to Britton's *Cathedrals*, seventeen of which have been treated by him in separate publications, beautifully and correctly illustrated; Bentham's *Ely*, and Miller's *Ely*; Dugdale's *Monasticon*; Dodsworth's *Salisbury*; Wild's *Lincoln and Worcester*; Browne Willis's *Survey of the Cathedrals*.)

CHURCH, STATES OF THE. [Papal States.]

CHURCHILL. [Marlborough.]

CHURCHILL, CHARLES, was born in 1731, in Westminster, where, in St. John's parish, his father was curate. After accomplishing the usual period of grammatical studies in Westminster School, he was taken by his father to Oxford to be matriculated in that university: but his volatility and vivacity of imagination, which already had prevented his becoming distinguished in the scholastic routine, occasioned his rejection at the entrance examination. It is said that the sage solemnity of the examiner's visage, arrayed in a large bushy wig, contrasted so strangely with the frivolous grammatical questions proposed for solution, that Churchill imprudently indulged in a fit of laughter; and instead of making the proper replies, he aggravated the indecorum of his conduct by making facetious and satirical remarks, and proceeded to interrogate the examiner, on which, of course, he was dismissed with indignant displeasure. He was shortly after admitted a member of the university of Cambridge, where however he took no degree, but soon returned to Westminster, where he became passionately attached to a young lady of the name of Scott, whom, although he was but in his seventeenth year, he precipitately married, without any means or plan of subsistence. After a year's residence in his father's house, he retired with his wife to Sunderland, and prepared for

taking orders. At the age of 25 he was ordained by bishop Sherlock, who is said to have exclaimed, 'Good God! before what sort of an examiner must this gentleman have been, when he was pronounced to be deficient in scholastic education?' Most of his biographers state that he now repaired to a curacy in Wales of 30*l.* a year, and that in order to provide for his family, he sought to augment this miserable pittance by fitting up a cider-cellar, and undertaking to supply this article to the neighbourhood; a project which terminated in his becoming a bankrupt. But this statement is contradicted by the editor of his works, published in 1804, who asserts, in a prefixed biographical account, which appears to be collected from authentic documents, that Churchill went at this period to officiate in the curacy of Rainham, in Essex, previously held by his father, and that he there opened a school. It is probable that the cider story may have arisen from some confused relation of the fact that Churchill was first ordained deacon on the small curacy of Cadbury, in Somersetshire, which, as being not far from Wales, and famous for cider, presents sufficient data for the makers of marvellous and interesting anecdotes. In 1758, on the death of his father, he succeeded to the curacy of St. John's, in Westminster, and from this period a total alteration took place in his character and habits, which, from having been hitherto those of a moral, domestic, and studious man, became gradually ruined, and terminated in avowed and abandoned licentiousness. This change may be attributed to his intimacy with the talented and profligate poet, Robert Lloyd, whose father, Dr. Lloyd, a master of Westminster school, about this time interposed as the friend of Churchill, and rescued him from jail by advancing to his creditors a composition of five shillings in the pound; but, to the credit of Churchill, it must be added, that he himself subsequently paid the whole amount. His first poems were 'The Bard' and the 'Conclave,' for which he was unable to obtain a publisher. 'The Rosciad,' a very clever and severe satire upon the principal theatrical managers and performers at that time, was published in 1761, at his own risk; the London publishers having refused to give five guineas for the MS. It obtained an amazing popularity, and was answered by the numerous parties attacked in Churchilliads, Murphyads, Examiners, &c. The subject is one on which the author, as a poet and constant play-goer, was well qualified to express a critical judgment. Like most of Churchill's productions, it is more remarkable for energy and eloquent roughness of sarcasm, than for polished phraseology or refined sentiment. His next poem, 'The Apology,' written in reply to his critical adversaries, is perhaps the most finished and correct of his works. The poem called 'Night' was intended as an apology for his own nocturnal celebrations of the rites of Bacchus. These orgies, in which Churchill was associated with the convivial wits of his time, Colman, Thornton, &c., are well described in Charles Johnson's 'Chrysal; or, the Adventures of a Guinea.' The argument of the 'Apology' is bad enough; showing only that the open avowal of vice and licentiousness is less culpable than the practice of it under the hypocritical assumption of sanctified temperance. 'The Ghost,' a poetical satire on the ridiculous imposture of Cock-lane, served but little to increase the literary fame of its author. With the exception of a few well-delineated characters, it is a series of rugged Hudibrastic incongruities. 'Pomposo,' in this poem, is intended for Dr. Johnson, who had designated Churchill 'a shallow fellow.' In 1762 Churchill became acquainted with John Wilkes, and contributed to the pages of the 'North Briton.' To gratify his political patron, he wrote 'The Prophecy of Famine; a Scots Pastoral,' which was greatly extolled, not only by Wilkes, and the politicians of his party, who said it was 'personal, poetical, and political,' but by the literary public. The editor of the last edition of Churchill's works declares it to be 'one of the most admirable specimens of satirical composition in the English language.' There is much humour in the following imitation of Virgil's 'Ante leves ergo pascentur in æthere cervi,' &c. (*Eclog.* 1.)

'Ah, Jockey, ill advisest thou, I wis,
To think of songs at such a time as this.
Sooner shall herbage crown these barren rocks;
Sooner shall fleeces clothe these ragged flocks;
Sooner shall want seize shepherds of the south,
And we forget to live from hand to mouth.'

The praise and profit which Churchill obtained by this jeu d'esprit seem to have overwhelmed his common sense: he plunged at once into the greatest irregularities of conduct, which drew from his parishioners a serious remonstrance, and induced him to relinquish the clerical profession. At the same time he quarrelled with and separated from his wife, who herself is said to have been any thing but a prude. The utter recklessness of his conduct at this period is shown by his seduction of a tradesman's daughter in Westminster, whom he shortly afterwards abandoned. His poem called 'The Conference' was composed whilst he seemed to suffer some feelings of contrition. A published letter to one of his friends on the occasion of his quitting his profession and his wife, contains the following assertion:—'I have got rid of both my causes of complaint —the woman I was tired of, and the gown I was displeased with. I find no pricks of conscience for what I have done, but am much easier in my mind. I feel myself in the situation of a man who has carried a d——d heavy load a long way, and then sets it down.' After throwing aside his clerical habit, he appeared in a blue coat, gold-laced waistcoat, large ruffles, and a gold-laced hat. His satirical 'Epistle to Hogarth' was revenged by the artist's caricature of 'The Reverend Mr. Churchill as a Russian bear' in canonicals, holding a club and a pot of porter, with a pug-dog which is treating the poet's works with great indignity. We have still to mention several poems, all of which are more or less satirical; namely, 'The Duellist;' 'The Author;' 'Gotham;' 'The Candidate;' 'Independence;' 'The Journey;' and 'Farewell.' Of these, 'The Author' is by far the most pleasing: the satire is general, and delineates with great effect the prim pedantry of collegiate life. 'The Candidate' is replete with poetical fire and spirit. 'Farewell' is comparatively tame, and 'Gotham,' which was written during a short fit of retirement and reformation, is chiefly descriptive. Churchill was a close and occasionally a very successful imitator of Dryden. His verses have much of the fervour and force of this great poet; and at the same time all the coarseness and ruggedness of Donne and Oldham. He has been styled the bard of liberty, and the scourge of tyranny. He was frank, sincere, and generous to a fault; and apparently not naturally vicious, but the unfortunate victim of dissolute companions. Cowper, in a long passage in his 'Table Talk,' assigns him, on the whole, a distinguished place as a poet, calling him a 'spendthrift alike of money and of wit.' He died at Boulogne, in 1765, while on a visit to Wilkes, his intimate friend. His complete works were published in 8vo., in 1804, with a life and portrait. Some interesting particulars are given in 'Genuine Memoirs of Mr. Churchill,' 12mo., 1765.

CHURCHWARDENS are parish officers, who by law have a limited charge of the fabric of the parish church, of the direction and supervision of its repairs, and of the arrangement of the pews and seats. Certain other duties are imposed upon them on particular occasions. There are usually two churchwardens in each parish, but by custom there may be only one. It is said by some authorities, that by the common law the right of choosing churchwardens is in the parson and the parishioners. This is however by no means universally the case, as a custom prevails in many parishes for the parishioners to choose both, and in some both are elected by a select vestry. The eighty-ninth canon of 1603 directs that 'churchwardens shall be chosen yearly in Easter week by the joint consent of the minister and parishioners, if it may be; but if they cannot agree, the minister shall choose one and the parishioners another.' It has however been questioned how far these canons are binding upon the laity, even in matters ecclesiastical.

The usual duties of churchwardens are, to take care that the churches are sufficiently repaired; to distribute seats among the parishioners, under the control of the ordinary; to maintain order and decorum in the church during the time of divine service; and to provide the furniture for the church, the bread and wine for the sacrament, and the books directed by law to be used by the minister in conducting public worship. In addition to these ordinary duties, the churchwardens are by virtue of their office overseers of the poor, under the statutes for the relief of the poor; they are also required to present to the bishop all things presentable by the ecclesiastical laws, which relate to the church, minister, or parishioners. In large parishes there are sometimes officers called sidesmen (*synodsmen*) or questmen, whose business it is to assist the

churchwardens in inquiring into offences and making presentments. Churchwardens and sidesmen were formerly required to take an oath of office before entering upon their respective duties; but by a recent statute, 5 and 6 Will. IV., c. 62, s. 9, it is enacted that, in lieu of such oath, they shall make and subscribe a declaration before the ordinary, that they will faithfully and diligently perform the duties of their offices.

If churchwardens are guilty of any wilful malversation, or if they refuse to account to the parishioners at the termination of their period of service, they may be proceeded against summarily before the bishop by any parishioner who is interested, or the new churchwardens may maintain an action of account against them at common law; in which action the parishioners, other than such as receive alms, are admissible as witnesses. (Stat. 3 Will. III., c. 11, sec. 12.) On the other hand, in all actions brought against them for any thing done by virtue of their office, if a verdict be given for them, or if the plaintiff be nonsuited or discontinue, they are entitled to double costs by Stats. 7 Jas. I. c. 5, and 21 Jas. I. c. 12.

Under the 59th Geo. III., c. 12, s. 17, churchwardens and overseers are empowered to take and hold lands in trust for the parish as a corporate body; and by a decision under this act, they can also take and hold any other lands and hereditaments belonging to the parish, the profits of which are applied in aid of the church rate. (Burn's *Justice*, and Burn's *Ecclesiastical Law*, tit. 'Churchwardens.')

CHUSITE. Found by Saussure in the porphyritic rocks near Limburg; occurs massive, granular, translucent and of a greasy lustre. Dr. Thomson refers it to Chrysolite.

CHUTA NAGPORE (LITTLE NAGPORE), a large zamindary in the district of Ramghur, forming the southern extremity of the province of Bahar, and containing, according to Major Rennell, 9329 square miles. The name Nagpore is indicative of the belief that the territory contains diamonds; and the distinctive title Chuta serves to distinguish it from the district of the same name in the Boonsla dominions. The surface of the country is much diversified. For the most part it is hilly and covered with jungle, the growth of which was, until very recently, much encouraged by the successive rajahs as the means of preventing invasion and preserving their independence, although it renders the climate unhealthy, especially to strangers. The country presents also several extensive plains, the soil of which is very fertile, and yields abundant harvests of pulse, wheat, barley, cotton, and sugar. The whole district is well watered, so far at least as relates to the irrigation of the land; the hills contain the sources of many streams, which do not attain any considerable size, so as to be navigable, until they have quitted the limits of the territory: under these circumstances, rice is produced in great abundance. Iron ore abounds in many parts of the district, but the expense of smelting would be so great that it is more advantageous to import iron from England than to establish furnaces upon the spot.

The country is but thinly populated in general, and contains only a small number of villages. Among the hills are some tribes who use little or no clothing, and are considered by the Brahmins as barbarians. For a long time subsequent to the first possession of Bahar by the English, the rajahs of Chuta Nagpore assumed and exercised independent powers, and did not allow of the jurisdiction of the English courts of justice. In 1809 a military force was sent into the country in order to establish the power of the British, and to organize a systematic police, which ends were accomplished with some difficulty. Previously to that time the rajah had paid to the government no more than 13,000 rupees per annum out of a clear revenue of 160,000 rupees, the residue being employed in keeping on foot a numerous body of soldiers. It has always been the system of the rajah to hold no personal communication with Europeans, and not to admit them into his presence. On the occasion just mentioned, the rajah, Govindnauth Sahi Deo, quitted his usual place of residence, and retreated into the jungle, where he succeeded in concealing himself, although brought to consent to the measures dictated by the English commander. Our present knowledge of the geography of the district and of its internal condition is very imperfect.

(Rennell's *Memoir*; *Report of Committee of Commons on the Affairs of India*, 1832.)

CHYDO'RUS (Zoology), Leach's name for a genus of *Branchiopoda* of the section *Lophyropa*. [BRANCHIOPODA.]

CHYLE (χυλός), the product of digestion formed by the action of the pancreatic juice and the bile on the chyme in the duodenum. [CHYME and DIGESTION.]

CHYME (χυμός), the product of digestion formed by the action of the stomach on the food. [DIGESTION.]

CIBBER, CAIUS GABRIEL, a celebrated sculptor, was a native of Holstein, and came to England during the Protectorate of Oliver Cromwell. The two figures of Raging and Melancholy Madness, which adorned the principal gate of Old Bethlehem Hospital, were his work, and also the bassi-rilievi on the pedestal of the London Monument. He married the daughter of William Colley, Esq. of Glaiston, in Rutlandshire, and granddaughter of Sir Anthony Colley, a stanch royalist, who in the cause of Charles I. reduced his estate from 3000*l.* to 300*l.* per annum. By this lady he had Colley Cibber, the actor, dramatist, and poet laureat. Mr. Cibber was employed in the latter years of his life by the earl, afterwards duke of Devonshire, in the improvement and decoration of the magnificent family seat at Chatsworth; and at the time of the Revolution in 1688, he took arms under that nobleman in favour of the prince of Orange.

CIBBER, COLLEY, was born, according to his own statement, on the 6th of November, O.S., 1671, in Southampton Street, Covent Garden. In 1682 he was sent to the Free School at Grantham, Lincolnshire. In 1687 he returned to London, and in 1688 was at his father's request received as a volunteer in the forces raised by the earl of Devonshire in support of the prince of Orange. In 1689 he indulged an early conceived inclination for the stage, by fixing upon it seriously as his profession; and after performing gratuitously for about eight or nine months, obtained an engagement at a salary of ten shillings per week. This pittance was afterwards increased to fifteen shillings; but a feeble voice and a meagre person were considerable obstacles to his progress, and the trifling part of the Chaplain in Otway's 'Orphan' was the first in which he obtained any notice. His performance of Lord Touchwood at a very short notice, in consequence of Mr. Kynaston's illness, obtained him the commendations of Congreve and five additional shillings per week. At this time, being scarcely twenty-two years of age, after a very short courtship, he married Miss Shore, to the great anger of her father, who immediately spent the greatest part of his property in the erection of a little retreat upon the Thames, which he called Shore's Folly. Mr. Cibber's professional progress was very slow for some years, notwithstanding his having turned author, and the success of his comedies, 'Love's Last Shift,' 'Love makes a Man,' 'She Would and She Would Not,' 'The Careless Husband,' &c. In 1711 however he became joint patentee with Collier, Wilks, and Dogget, in the management of Drury Lane, and afterwards with Booth, Wilks, and Sir Richard Steele; which latter partnership continued till the death of Mr. Eusden, the poet laureat, in 1730, when Cibber was appointed to succeed him, and sold out, having become during his nineteen years' management so great a favourite with the public in the performance of fops and feeble old men, that after he had retired from the stage he was occasionally tempted back to it by the offer of fifty guineas for one night's performance. In 1745 he played Pandulph in his own tragedy of 'Papal Tyranny,' being at that time in the seventy-fifth year of his age. On the 12th of December, 1757, about nine in the morning, he was found dead in his bed by his man-servant, with whom he had been in conversation about three hours before apparently in perfect health. He had recently completed his eighty-sixth year.

Mr. Cibber has described himself with considerable candour in his well-known and very amusing 'Apology' for his life. Vain, inconsistent, and negligent, he was withal a quick-witted, good-humoured, and elegant gentleman. His person, though spare and unprepossessing in youth, improved considerably as he advanced in life: a fact confirmed by a fine portrait of him in the collection at the Garrick Club, in his favourite part of Lord Foppington. As a writer of comedy, he is inferior perhaps only to Congreve, Wycherly, and Vanbrugh; but his Birth-day Odes are by no means exceptions to the usual dulness of such compositions. His best comedy is allowed to be 'The Careless Husband,' the dialogue of which is delightfully easy and polished; but the

play which brought him the most money was his adaptation of Molière's 'Tartuffe,' entitled 'The Nonjuror,' on which Bickerstaff afterwards founded his 'Hypocrite.' For this play King George I., to whom it was dedicated, sent him 200*l*. He was the author and adapter of nearly thirty dramas of various descriptions, amongst which, besides those already mentioned, we may record 'The Provoked Husband,' written in conjunction with Sir John Vanbrugh, and the modern acting version of Shakspeare's 'Richard III.' His 'Apology' is published in two vols., 12mo., and his dramatic works in five vols., 12mo.

CIBBER, THEOPHILUS, the son of the laureat, was born on the 26th November, 1703. At the age of thirteen he was sent to Winchester school, where he remained but three or four years, for in 1721 we find him on the stage performing in the 'Conscious Lovers.' He acquired considerable reputation in characters similar to those supported by his father. He married early an actress of the name of Johnson, who died in 1733, and in 1734 he formed a second union with Miss Arne. His extravagant habits forced him to retire to France in 1738, and on his return he separated from his wife under very discreditable circumstances. After twenty years more passed some in prison and the rest in alternate prodigality and penury, he engaged with Mr. Sheridan of the Dublin theatre, and sailed for Ireland in company with Mr. Maddox, a dancer on the wire, in the month of October, 1758. The vessel was however driven by a storm on the coast of Scotland, and going immediately to pieces, Cibber, his companion, and the greater number of the passengers perished.

Cibber wrote and altered a few unimportant dramas, and was concerned in a work entitled 'An Account of the Lives of the Poets of Great Britain and Ireland,' 5 vols., 12mo., which was published under his name only.

CIBBER, SUSANNA MARIA, the daughter of Mr. Arne, an upholsterer in Covent Garden, and sister of Dr. Thomas Arne the composer, made her first appearance as a singer. In 1734 she married Mr. Theophilus Cibber, son of the laureat, and in 1736 attempted the part of Zara in Hill's tragedy of that name. Her success was most decided, and she rapidly became a great and deserved favourite. Her union with Mr. Cibber was an unfortunate one, and a separation took place about five years afterwards. She died January 30, 1766, and was buried in the cloisters of Westminster Abbey. Garrick is reported to have exclaimed when he heard of her death, 'Then Tragedy expired with her!'

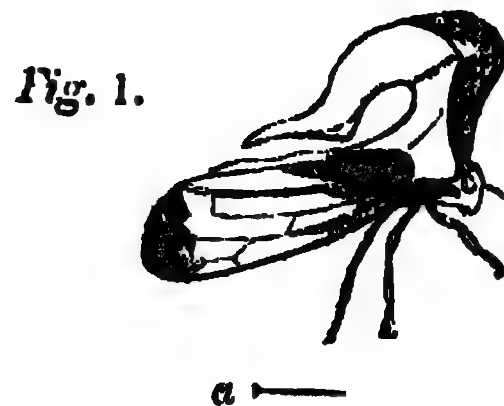
CICADA'RIÆ. [HOMOPTERA.]

CICADE'LLA (Latreille), CERCO'PIDÆ (Leach), a family of insects of the order Hymenoptera and section Cicadariæ. This family is synonymous with the Cicada Ranatra of Linnæus. The species may be distinguished from those of allied groups by their having the antennæ situated between the eyes. These insects are generally small, and leap by means of their hind legs.

The genera may be arranged under two heads or sections; those in which the head is hidden by the pro-thorax, which is always very large, generally much humped, and has the posterior portion produced over the abdomen, sometimes so as to completely cover that part, or even extend beyond its apex; the antennæ are very small, and inserted in a cavity on the head. To this section belong the genera *Membracis, Tragopa, Darnis, Bocydium,* and *Centrotus.*

There are perhaps no insects more remarkable in structure, and whose appearance is more grotesque, than most of the species of this group. Their peculiarity arises from the great development of the pro-thorax: this part is sometimes so large as greatly to exceed in size all the other parts taken together. We have selected for illustration two species of the genus *Bocydium*, as being the most remarkable; the first is the *Bocydium tintinnabuliferum*. In this species the thorax is black and glossy; the posterior part is elongated and pointed, and from the disc there arises a vertical appendage, the summit of which bears four slender horizontal stalks, each of which is furnished with a little round black spherical body: these little globes are covered with fine hairs; the abdomen is reddish, and the wings are variegated with the same colour.

The second is the *Bocydium galeritum*. This species, as well as the one just described, inhabits Brazil; the pro-thorax is of a dark reddish-brown colour; the posterior part is elongated; the disc is elevated into a process which is at first compressed, but at the summit becomes dilated into a broad angular mass, and throws out a flattened portion, which suddenly bends downwards towards the body, and then runs parallel with it. The wings are transparent, with the exception of the basal and apical portion of the upper ones. The principal distinguishing characters of the genus *Bocydium* consist in the elytra being wholly or partially exposed, *i. e.*, not covered by the pro-thorax; and the posterior prolongation of the pro-thorax narrowed and pointed.



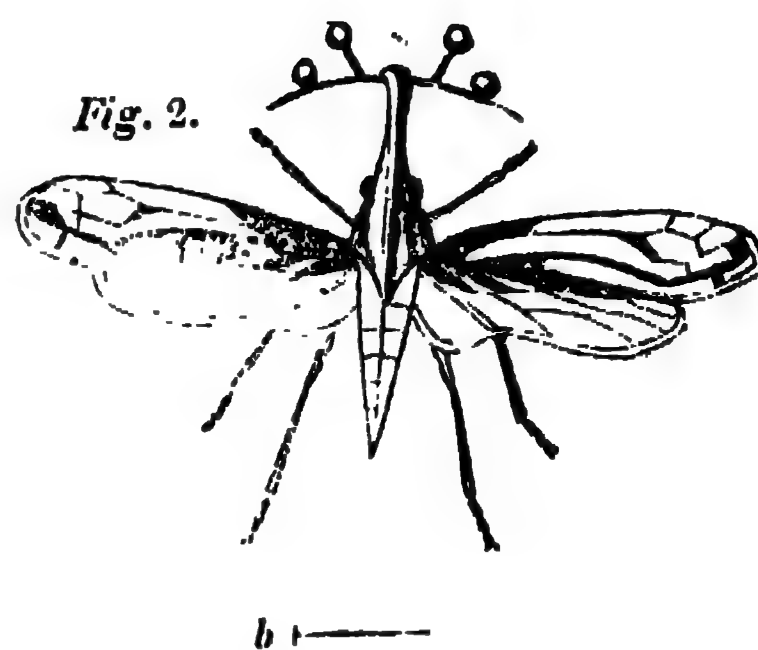


Fig. 1. Bocydium galeritum. *a*, natural length.
Fig. 2. Bocydium tintinnabuliferum. *b*, natural length.

Of the genus *Centrotus* two species are found in England; the more common species is *Centrotus cornutus*. This little insect is found on the leaves of the hazel and other shrubs, in the early summer months. It is about one-third of an inch in length, and of a brown colour; the pro-thorax is prolonged posteriorly (this part is compressed and pointed, and extends nearly to the apex of the abdomen), and the sides are dilated, and form two horn-like projections: a character from which the insect has received in France the name of *le petit Diable*. The wings are brownish and semi-transparent. In this genus the wings are exposed, as in the last, but the species differ in having a visible scutellum.

In the second division of the *Cicadellæ*, the head is on a line with the upper surface of the pro-thorax, or nearly so; the latter part is of moderate size, and without the extraordinary processes which characterize the former division—the wings are consequently always entirely exposed; the scutellum is distinct and of a triangular form. To this division belong the genera *Ætalion, Ledra, Ciccus, Cercopis, Eulopa, Euplex, Penthimia, Jassus, Tettigonia,* and some others.

Of the genus *Cercopis* (Latreille) we have many species in this country. They are all small. The largest and most beautiful of the British species is the *Cercopis vulnerata*. This insect is about one-third of an inch in length; black; the upper wings are obscure, and have each two large red spots (one at the base and another in the middle), and a fascia of the same colour near the apex, the black and the red being about equally divided; the under wings are transparent. This species is not uncommon in various parts of the country, and is found on the herbage in woods. *Cercopis spumaria* is one of the most common insects we have, being found in abundance on the various plants in our gardens. It is sometimes called the frog-hopper, from its habit of leaping when approached. Its colour is brown, the under wings are transparent, the upper wings have two white spots, one in the middle and another towards the apex. The larva, in form, resembles the perfect insect, except that it is destitute of wings; it is soft and of a greenish colour, and is always found on the leaves of plants inclosed in a frothy liquid, with which it surrounds itself, probably as a protection against the sun's rays. This frothy liquid is commonly known in England by the name of cuckoo-spit, and in France it is called *crachat de grenouille*. The pupa differs only from the larva

in having rudimentary wings; the perfect insect is about three-sixteenths of an inch in length.

The characters of the genus *Cercopis* are:—Antennæ with the third joint conical, and terminated by an inarticulate seta; head furnished with ocelli. This genus was established by Fabricius, and has lately been subdivided. The insect last described belongs to one of these subgenera (*Aphrophora* of Germar), in which the head has the posterior margin concave, and the ocelli are more widely separated than in the genus *Cercopis* as now restricted. The characters of some other sub-genera will be found in a paper by Mr. Lewis, in the first part of the *Transactions of the Entomological Society*.

The genus *Ciccus* differs from *Cercopis* principally in the species having the seta of the antennæ articulated and composed of five joints; the anterior part of the head usually projects.

CICE'R, a genus of leguminous or fabaceous plants, allied to the vetch. A five-lobed calyx which projects on the upper side, and an inflated two-seeded pod with tuberculated seeds, give its character. One species, *Cicer arietinum*, the Chick pea, a native of Egypt and the Levant, is cultivated in the south of France for its seeds, which bear a striking resemblance to a ram's head. They have for ages been a common food in the eastern parts of the world, but their taste is unpleasant to Europeans. It is an annual, and bears pale violet solitary flowers. Two or three other species are known to botanists.

The most remarkable circumstance about *Cicer arietinum* is, that during the heats of summer its leaves and stem exude little viscid drops, which, on evaporation, leave behind crystals, nearly pure, of oxalic acid. Its grateful refrigerating qualities are owing to this acid. Persons who walk through the fields where it grows, with common leather shoes, find them destroyed by the acid. Those who are predisposed to calculous complaints should avoid its excessive use, either as a salad or boiled. The frequent use of this vegetable, or any other abounding with oxalic acid, leads to the formation of the oxalate of lime, or mulberry calculus, in the bladder, which is the most painful, and the least influenced by internal treatment. (See Majendie *on Gravel*, 2nd French edit.)

CI'CERO, MARCUS TULLIUS, was born at Arpinum on the 3rd of January, 106 B.C., in the consulship of Q. Servilius Cæpio and C. Atilius Serranus, and was thus a few months older than Pompey, who was born on the last day of September in the same year. [ARPINUM.] The family seat was on the south bank of the little stream Fibrenus (fiume della posta), near its junction with the Liris (Garigliano), where the stream of the Fibrenus dividing, forms an island and cascade, the scenery of which is the subject of the dialogue at the beginning of the second book 'De Legibus.' The villa Ciceronis is now occupied as a Dominican convent.

The grandfather of Cicero was living here at the time of his birth, and appears to have been a man of influence at Arpinum, where, on a petty scale, the political disputes formed a counterpart to those at Rome. The old man seems to have entertained the same views of public polity as his son, and vehemently opposed the introduction of the vote by ballot into the municipal proceedings at Arpinum, when a law to that effect was proposed by one Gratidius, whose family was intimately connected with the Marii, and whose sister, it may be observed, was the wife of old Cicero, and consequently the grandmother of the orator. The matter in dispute was referred to the consul Scaurus at Rome, who expressed his regret that a man of old Cicero's energy should have preferred to exert his talents in a petty corporation rather than on the great theatre at Rome. There is likewise a characteristic saying of his recorded by his grandson, that the men of his day were like Syrian slaves,—the more Greek they knew the greater knaves they were,—an observation probably aimed at his opponent Gratidius, who was well acquainted with that language. This Marcus Cicero had two sons, Marcus and Lucius. The younger of these, together with his uncle Gratidius, who was killed there, served under Antony the orator in his government of Cilicia. Lucius left a son of the same name, to whom his cousin Cicero was much attached, and whose death he deplores in one of his earliest letters to Atticus.

Marcus Cicero, the father of the orator, though he was on intimate terms with the leading men of the times, was compelled, by the delicacy of his health, to live in retirement; but this enabled him to pay the more attention to the education of his two sons Marcus and Quintus. His wife Helvia had a brother, Aculeo, the intimate friend of L. Crassus, a man equally distinguished for his oratory and the public offices he had held; and the two sons of Aculeo, with their cousins the young Ciceros, received their education together under teachers selected by Crassus. It is to this circumstance probably that we must attribute the special direction of Cicero's talents to the study of oratory. He was afterwards removed by his father to Rome, where he had the assistance of Greek instructors, more particularly the poet Archias, who was living under the roof of L. Lucullus. As soon as he had exchanged the boy's dress for the toga, he was placed under the care of Q. Mucius Scævola, the augur, and father-in-law of his father's friend Crassus, and upon his death attached himself to the pontifex of the same name, who excelled all his contemporaries in his knowledge of law, and added to his other accomplishments considerable powers of eloquence. While Cicero was thus preparing himself for the forum, he relieved the severity of his legal and philosophical studies by an intermixture of poetry. Even as a boy he had composed a poem called 'Pontius Glaucus,' which was extant in Plutarch's time, and he now translated the 'Phænomena' of Aratus into Latin verse, besides writing two original poems, one called 'Marius,' in honour of his fellow-townsman, which received the commendation of Scævola, and another entitled 'Limon.' But he was now arrived (B.C. 89) at the age when he was called by the laws of his country to the military profession, and he served his first campaign in the Marsic war under Pompeius Strabo, the father of the great Pompey, and was present when Sulla captured the Samnite camp before Nola. The termination of the Marsic war in the following year gave Cicero an opportunity of attending the lectures of two distinguished Greek philosophers; first Philo, who then presided over the Academy, and soon after Apollonius Molo of Rhodes, who had been driven from their homes by the arms of Mithridates. This prince had been long watching for an opportunity of attacking the authority of Rome. The late civil war in Italy had induced him to throw off all disguise. He had overrun the Roman province of Asia, and was already master of nearly all Greece, when the Romans concluded the war with their Italian allies, with the intention of opposing their formidable enemy in the East. But unhappily that which should have led to a union of their strength was the cause of divisions still more disastrous. The command of the war against Mithridates was disputed between old Marius and Sulla, and led to a series of civil commotions. Sulla however, who was at the time consul, had the important province of that war allotted to him. The appointment excited the furious opposition of the Marian party, and Sulla was unable to maintain the superiority of his party at Rome but by bloodshed and proscription. His departure for the Mithridatic war was the signal for re-action, and Marius re-entered Rome (B.C. 87) with the support of the consul Cinna, and put to death all the most distinguished leaders of the aristocratic party, who were unable to make their escape to Sulla's army in Attica. Cicero's schoolfellow Pomponius was probably one of the fugitives, for he left Rome about this period, and by a twenty years' residence in Athens acquired the surname of Atticus. Of Cicero's pursuits during the three or four next years little more is known than that he wrote some rhetorical works, which dissatisfied his maturer judgment; probably the work entitled 'De Inventione,' besides translating the 'Œconomics' of Xenophon, and several dialogues of Plato. He was also in the habit of declaiming both in Greek and Latin, and received instruction in philosophy and logic from the stoic Diodotus, whom we find afterwards living under his roof, where in fact he died, leaving his property to Cicero. He had also a second opportunity of hearing Molo at Rome, when the philosopher was sent on an embassy to remind the senate of the services of his countrymen in the late war against Mithridates. In his twenty-sixth year (B.C. 81), when Sulla had extinguished all the democratic elements of the Roman constitution, Cicero made his first appearance as an advocate. The speech in favour of Quinctius, though not the first he delivered, is the earliest of those which are now extant. In the following year his voice was first heard in the forum in defence of Sextus Roscius of Ameria, on a charge of parricide. The subject matter of the trial was intimately mixed up with the late civil dissensions, so that it attracted much public atten-

tion. Cicero fully prepared himself for the occasion, and produced so powerful an impression, that, to use his own words, the public voice at once placed him among the first orators of Rome. When he had spent two years in the severe duties of his profession, the delicacy of his health led him to withdraw for a time from Rome. He first visited Athens (B.C. 79), where he devoted six months to Antiochus of Ascalon, the most distinguished philosopher of the old Academy. He also attended Phædrus and Zeno of the Epicurean school, in company with his friend Atticus, and practised declamation under the directions of an able rhetorician, named Diogenes, of Syria. He next traversed the whole Roman province of Asia, still cultivating his favourite pursuit of oratory under the first teachers of that country; and then crossed over into Rhodes, where, for the third time, he placed himself under Molo, and derived considerable benefit from his instruction, in correcting the redundancy of his style, and moderating the vehemence of his voice and action. He studied philosophy likewise under Posidonius.

In the year B.C. 77, after a two years' absence, during which Sulla had died, Cicero returned to Rome, and married Terentia, whose rank and station in society we may estimate by the fact that her sister Fabia was one of the vestal virgins. He applied himself again with zeal to the law courts and the forum, in which at this time the most distinguished orators were Aurelius Cotta and Hortensius; but next to them stood Cicero, whose services were in constant demand for causes of the highest importance. But independently of the reputation he was acquiring, he was at the same time opening the way to the political honours of his country; and it is a somewhat singular coincidence, that in the year B.C. 76 the three first orators of Rome, Cotta, Hortensius, and Cicero, were successful candidates for the several offices of consul, ædile, and quæstor, which they respectively filled in the following year. The provinces of the quæstors being distributed to them by lot, the island of Sicily fell to Cicero's share, or rather the western portion of that island, which had Lilybæum for its chief town; the whole island being under the government of S. Peducæus as prætor, with whom Cicero, and above all Atticus, lived on terms of the closest intimacy, until Peducæus fell with Pansa at the battle before Mutina. Sicily was one of the granaries, as it were, of Rome, and the quæstor's chief employment in it was to supply corn for the use of the city; and as there happened to be a peculiar scarcity this year at Rome, it was necessary to the public quiet to send large and speedy supplies. This task Cicero accomplished, he tells us, and at the same time gave the highest satisfaction to all parties in the province. In the hours of leisure he employed himself, as at Rome, in his rhetorical studies; so that on his return from Sicily his abilities as an orator were, according to his own judgment, in their full perfection and maturity. Before he left Sicily he made a tour of the island, and gratified himself by a visit to Syracuse, where he discovered the tomb of Archimedes, which had been lost sight of by his countrymen, and was found overgrown with briers. He came away from the island extremely pleased with the success of his administration, and flattering himself that all Rome was celebrating his praise. In this imagination he landed at Puteoli, and was not a little mortified on being asked by the first friend he met, 'How long he had left Rome, and what news he brought from thence?' This mortification however led him to reflect that the people of Rome had dull ears, but quick eyes; so that from this moment he resolved to stick close to the forum, and to live perpetually in the view of his countrymen.

Pompey was at this time carrying on the war against Sertorius in Spain. Nicomedes, king of Bithynia, soon after died, leaving the strange legacy of his kingdom to the Romans; and the king of Pontus, ever ready to avail himself of the dissensions of the Romans, and justified on the present occasion by the Bithynian intrigue, renewed his hostilities by a double invasion of Bithynia and Asia. The two consuls, Lucullus and Cotta, were both sent to oppose him; and while the arms of Rome were thus employed in the different extremities of the empire, a still more alarming war (B.C. 73) broke out at home, which originating with some gladiators led to an extensive insurrection of the slaves, and under the able conduct of Spartacus threatened the very existence of the state. During this turbulent period Cicero persevered in a close attendance upon the forum, though none of the speeches which he then delivered have been preserved, excepting those which relate to the prosecution against Verres. Peducæus had been succeeded, after one year's government of Sicily, by Sacerdos, and he, after the same interval, by Verres; for it was a principle of Roman policy to give to as many as possible a share in the plunder of the provinces; though occasionally superior influence, not the merit of the individual, led to a continuance of his government for two or even three years. Such was the case with Verres, who during three years made the Sicilians feel all those evils in their worst form which the Roman principles of provincial administration in bad hands were so well calculated to produce. Cicero had many difficulties to overcome in his endeavours to subject the criminal to the punishment of his crimes. In the first place the judices (jury), under the law of Sulla, would consist exclusively of senators; that is, of those who had a direct interest in protecting provincial mal-administration. Moreover at the very outset there started up a rival in one Cæcilius, who had been quæstor under Verres, and claimed a preference to Cicero in the task of impeaching him. A previous suit, technically called a *divinatio*, was necessary to decide between the rival prosecutors. Cicero succeeded in convincing the jury that his opponent's object was, to use another technical term, *prævaricatio;* that is, to screen the criminal by a sham prosecution. This previous point being settled in his favour, he made a voyage to Sicily to examine witnesses and collect facts to support the indictment, taking his cousin Lucius Cicero to assist him. Fifty days were spent in their progress through the island, in which he had to encounter the opposition of the new prætor Metellus, who was endeavouring, with many of the leading men at home, to defeat the prosecution. On his return to Rome he found it necessary to guard against all the arts of delay which interest or money could procure for the purpose of postponing the trial to the next year, when Hortensius and Metellus were to be consuls, and Metellus's brother one of the prætors, in which character he might have presided as judge on the trial. Cicero was induced therefore to waive the privilege of employing twenty days in the accusation; and a single speech on the 5th of August, followed by an examination of his witnesses and the production of documentary evidence, produced an impression so unfavourable to Verres, that even his advocate Hortensius was abashed, and Verres went forthwith into exile.

The five other speeches against Verres, in which Cicero enters into the details of his charges, were never actually spoken, if we may believe the commentator upon these orations—who passes under the name of Asconius—but were written subsequently at his leisure; partly perhaps to substantiate his charges before the public, but still more as specimens of what he could do in the character of an accuser, which he did not often sustain.

Though a verdict was given against Verres by the jury of senators, yet the past misconduct of that order in their judicial capacity had been so glaring that the public indignation called for the election of censors, whose office had slept for some years; and the magistrates so appointed erased from the roll of the senate sixty-four of that body, expressly on the ground of judicial corruption. To remedy the evil for the future a new law was passed, at the suggestion of the prætor Aurelius Cotta, hence called the *lex Aurelia*, by which the equites (knights) and certain of the commoners (*tribuni ærarii*) were associated with the senators in the constitution of public juries. It was subsequent to the enactment of this law that Cicero made the speeches in defence of Q. Roscius, M. Fonteius, and A. Cæcina. The first of these was the celebrated actor, whose name has since become proverbial. The suit grew out of a compensation which had been made for the death of a slave, whom Roscius had educated in his own profession. M. Fonteius was the object of a prosecution for extortion and peculation (*de repetundis*) in the province of Gallia Transalpina; and must have been guilty, if we may judge from the fragments of his advocate's speech which have come down to us. The cause of Cæcina was of a private nature, and turned entirely upon dry points of law. The ædileship of Cicero (B.C. 69) had little of that magnificence which was so commonly displayed in this office, but it gave the Sicilians an opportunity of showing their gratitude to the prosecutor of Verres, by supplies for the public festivals. After an interval of two years Cicero entered upon the office of prætor (B.C. 66), and it fell opportunely to his lot to preside in the court of extortion; a court especially provided against that ordinary offence in the administration of

the provinces. The year of Cicero's prætorship was marked by the conviction of Licinius Macer, in opposition to the influence of his kinsman Crassus. But the most remarkable event in his prætorship was the passing of the Manilian law, by which the command of the war against Mithridates was transferred to Pompey, whose claims Cicero supported in a speech which still remains. It was in this year too that he defended Cluentius. This speech likewise exists, and gives a sad spectacle of the uncertainty of life and property at this period. Before the close of his prætorship he betrothed his daughter Tullia, who could not have been more than ten years old, to C. Piso Frugi. She was at present his only child, for his son Marcus was not born until the middle of the following year, which was also the birth-year of Horace.

On the expiration of his office he declined the government of a province, which was the usual reward of that magistracy, preferring to employ his best efforts at home towards the attainment at the proper period of the consular office. This was perhaps his chief object in undertaking the defence of C. Cornelius, the tribune of the preceding year, against a charge of treason, which was supported by the whole influence of the aristocracy. The guilt of Cornelius consisted in his energetic and successful support of the law against bribery in elections, called the *Lex Acilia-Calpurnia.* Cicero published two orations spoken in this cause, the loss of which is the more to be regretted, as they were reckoned among the most finished of his compositions, both by others and by himself. The return of Atticus from Athens at this time was most opportune to his friend Cicero, who looked upon the following year (B.C. 64) as the most critical in his life; and Atticus being intimately connected with the influential men of the aristocratic party, could give essential assistance to a new man, as the phrase was, against six candidates, two of whom were of patrician blood, while the fathers or ancestors of all had already filled public magistracies. Cicero's father just lived to witness the election of his son to the highest office in the state.

From this point the life of Cicero is the history of the times. Of the orations he made in the year of his consulate he has himself given a list in a letter to Atticus.

On the kalends of January, immediately upon his assuming the consular robes, he attacked a tribune, P. Servilius Rullus, who had a few days before given notice of an Agrarian law, the meaning of which term has already been explained under that name. Of this speech, which was addressed to the Senate, there exists a considerable fragment, and enough to show that Cicero was already prepared to attach himself to the aristocratic party, whereas up to this time his political life had been of an opposite complexion. His panegyrist, Middleton, seems to acknowledge the change, and attributes his past conduct to that necessity by which the candidates for office were forced, in the subordinate magistracies, to practise all the arts of popularity, and to look forward to the consulship as the end of this subjection. Before the people indeed, to whom he addressed two speeches upon the same subject, Cicero still wore the popular mask; and while he expressed his approbation of the principle of Agrarian laws, and pronoun ed a panegyric on the two Gracchi, he artfully opposed the particular law in question on the ground that the bill of Rullus created commissioners with despotic powers that might endanger the liberties of Rome, and he prevailed on one of the other tribunes to put his veto upon the bill. In the defence of Rabirius, who was charged with the murder of the tribune Saturninus three-and-thirty years before, he goes so far as to maintain the right of the senate to place Rome in a state of siege, if we may borrow a modern term, or, in other words, to suspend all the laws which protect the lives of citizens, yet, in the same speech, he endeavours to curry favour with the people by heaping the highest praises on their favourite Marius. Rabirius had already been convicted by the judges appointed to investigate the charge; but appealed, as the law allowed him, to the people, who accordingly assembled in the Field of Mars to hear the appeal. While the trial was proceeding, it was observed that the flag upon the Janiculum on the other side of the Tiber was lowered. This of necessity broke up the assembly, according to an old law which was made when the limits of the Roman empire extended only a few miles from the city, and was intended to protect the citizens from being surprised by the enemy. The object of the law had long passed away, but Roman superstition still maintained the useless ceremony, and the aristocratic party employed it on the present occasion in the hands of Metellus the prætor to annul the proceedings of justice. The orations in which he defended Otho against the populace, who were enraged at his law for setting apart special seats in the theatre for the order of the knights, and that in which he opposed the restoration of their civil rights to the sons of those who had been proscribed by Sulla, were also delivered this year, but nothing remains of them. Of the conspiracy against Catiline, and the several speeches which were made by Cicero in relation to him, it is unnecessary to say more than will be found under the head CATILINA.

Two other causes, in which Cicero's services as an advocate were called forth during this year, were those in which he defended C. Calpurnius Piso, the consul of 67 B.C., and L. Murena, the consul elect. The oration in defence of Piso is not extant, but it appears that the prosecution was for extortion in his government of Cisalpine Gaul, and was maintained at the instance of Cæsar. Cicero, in a speech made on a subsequent occasion, seems to admit the guilt of his client, and to account for his acquittal on grounds altogether foreign to the merits of the case; another proof of the change that had taken place in the patriotic prosecutor of Verres. His conduct is not less reprehensible in the affair of Murena, who was charged with bribery, treating, and other violations of the law, in his late election to the consulship. His guilt will not be doubtful to a careful reader of his advocate's speech. The prosecution was supported by Sulpicius and Cato, the former a man who may be looked upon as almost the founder of Roman law as a science, and Cato certainly the most honest of his party. Yet Cicero, instead of grappling with the charge, descends to a personal attack on the advocates opposed to him, rallying the profession of Sulpicius as trifling, and the principles of Cato as impracticable. His defence amounts in fact to a defence of the crime rather than the criminal, which was the more discreditable, as he himself had only a few weeks before carried a new law against bribery.

The success of Cicero, in crushing the Catilinarian conspiracy, would probably have earned for him the unmixed good will of the aristocratic party, had he not offended them by the vanity and presumption which that success engendered, and which were the more offensive to them in one whose origin they despised. So completely was he carried away by his sense of his services to his country that he wrote a history of his consulship in Greek, and even sung his own glories in verse: but the most decisive evidence of his unbounded vanity is the extraordinary letter which he addressed to his friend Lucceius. (*Ad Fam.* v. 13.)

On the other side he had damaged his reputation with the people by his evident change of principles; and the precipitate execution of the conspirators, without the form of a trial, was an offence against the laws of the country which the sanction of the senate could not justify. Already on his laying down his office there were symptoms of that hostility which gradually increased, and in a few years drove him in disgrace from the city which he had lately saved.

But we must return for a while to his forensic exertions. While the associates in the crimes of Catiline were, for the most part, prosecuted and driven into banishment, it pleased the party of the senate to screen P. Sulla, whose guilt is generally asserted by the historians of the times. Hortensius and Cicero were his advocates, and the support of the latter is reported to have been bought by a loan of money, which Cicero required for a purchase he was then making of a house on the Palatine Hill. To see this in its true light, it should be recollected that the receipt of a fee was at variance with the avowed principles of the Roman bar. The anecdote stands upon the authority of A. Gellius, which might have been insufficient, were it not indirectly yet decisively confirmed by more than one passage in Cicero's letters. In the following year Quintus Cicero, the brother of the orator, was appointed to the government of the rich province of Asia, as successor to L. Flaccus, who came home with the usual reputation for extortion, for which he was called to account two years after. This L. Flaccus had been the chief prætor in the consulship of Cicero, and in that capacity had been of great service in the detection of the conspiracy, so that he had a certain claim upon Cicero, which was not neglected. But this trial was preceded by one of the same nature which more nearly concerned the orator.* C. Antonius, who had been his col-

* We have omitted a mysterious affair which occurred this same year, B.C. 59. The facts are these: One Vettius, only known to us before this as an

league in the consulship, was recalled from the province of Macedonia, where he had presided for two years, and had to defend himself against an impeachment for the gross rapacity of which he had been guilty. This province had originally fallen to the lot of Cicero, who took credit on many occasions for his disinterestedness in transferring the lucrative appointment to his colleague. He omitted to state that there was a secret agreement between them, by which Antonius bound himself to make a pecuniary return to Cicero; and the extortion of which the proconsul had been guilty was in part owing to this obligation. The very day on which Antonius was condemned was marked by an event still more fatal to the peace of Cicero—the adoption of Clodius, his enemy, into a plebeian family. The object of this ceremony was to render Clodius eligible to the tribunate, from which, as a patrician, he was excluded; and no sooner was the obstacle removed than he offered himself as a candidate, and was elected without opposition. After some little manœuvring the cause and object of which are not very intelligible, he made public advertisement of several new laws, which were all aimed at the authority of the senate; and among them was one to the effect that whoever took the life of a citizen uncondemned and without a trial should be interdicted from fire and water. Although Cicero was not named in this law, it was so evidently aimed at him, that it was necessary for him at once to decide upon the course he would pursue. Some recommended him to resist the law by force, but when he found that Pompey was unwilling to support him, he took the advice of his friends Cato and Hortensius, which coincided with the views of Atticus, and leaving the field to his adversaries, went into voluntary exile. Leaving Rome towards the end of March (B.C. 58), he proceeded to Vibo with the intention of crossing over into Sicily, but from this he was prohibited by the governor, Virgilius, although he was of the same political party, and was under obligations to Cicero. He received about the same time information from Rome that a special law had been passed, which forbade him to appear within a distance of four hundred miles. Under these circumstances he changed his route, and proceeded first to Brundisium, where he was hospitably entertained for some weeks, in defiance of the law. He then crossed over to Dyrrhachium, where he was received by Plancius, the quæstor of the province, and conducted by him to Thessalonica. The conduct of Cicero in his exile was such as might have been expected from one whose mind had been so extravagantly elated in prosperity. He gave himself up entirely to despondency; spoke of his best friends as enemies in disguise, not even sparing Atticus and Cato; and so completely lost the control of his feelings and his conduct, that his mind was supposed to be deranged. In the mean time, his friends at Rome, whose fidelity he doubted, were actively engaged in taking measures for his recall. Already on the 1st of June an unsuccessful motion was made in the senate to that effect. The election, too, of his friend Lentulus Spinther to the consulate, offered a brighter prospect for the ensuing year, but in the interval there occurred a little incident which gave him fresh uneasiness. Some of his enemies had published an oration, which he had composed some years before in an angry moment, against an eminent senator, and had shown privately to his intimate friends. Its appearance at so untoward a moment alarmed Cicero, who imagined it had been destroyed, and he wrote to Atticus requesting him to disavow it. 'Fortunately,' says he, 'I never had any public dispute with him, and as the speech is not written with my usual care, I think you may convince the world that it is a forgery.'

Towards the end of the year his residence at Thessalonica became disagreeable to him, and indeed he thought dangerous. His enemy Piso had been appointed governor of Macedonia, and the troops who were to serve under him were already expected. Even before this, some of the accomplices of Catiline, who were living in Macedonia as exiles, had been plotting, it was said, against the life of Cicero. He therefore found it safer to remove to Dyrrhachium, where he had friends, although it fell within the distance prohibited by the law. His residence upon this coast afforded an opportunity likewise for an interview with his friend Atticus, who was in the habit of visiting a favourite estate near Buthrotum. While Cicero was harassing himself with perpetual fears and suspicions, his cause was proceeding prosperously at Rome. The tribunate of Clodius terminated in December; the new tribunes were, almost without exception, friendly to his recall; and on the first day of the new year the new consul Lentulus moved the senate for his restoration. His opponents, however, were not yet driven from the field. The tribunitial veto was employed more than once to check the proceedings. Scenes of riot and bloodshed disgraced the streets of Rome. Yet at last, on the 25th of May, a decree in his favour passed the senate; and on the 4th of August a law, in confirmation of the decree, was carried by the people in the great meeting of the Centuries. Cicero, in anticipation of these measures, had embarked for Italy on the very day the decree of the senate was passed, and landed the next day at Brundisium, where he was received by his daughter Tullia. The inhabitants of the city were profuse in the honours they paid him, and when the news, that the law had passed the Centuries, summoned him to Rome, the inhabitants of the cities through which he passed flocked in crowds to congratulate him.

Cicero's return was, what he himself calls it, the beginning of a new life to him. He had been made to feel in what hands the weight of power lay, and how dangerous it was to lean on the support of his aristocratical friends. Pompey had served him on the late occasion of his recall from exile, and had acted with the concurrence of Cæsar, so that it was a point of gratitude as well as prudence to be more observant of them than he had hitherto been. To the former he took an early opportunity of showing his gratitude by proposing that he should be commissioned to provide for a better supply of corn at Rome, where the unusual price of bread had already occasioned serious disturbances. For this purpose he recommended that Pompey should be invested with absolute power over all the public stores and corn-rents of the empire for five years. The proposition was readily accepted, and a vote passed that a law to that effect should be brought before the people. The law was favourably received by all parties, and Pompey named the proposer of the law the first among his fifteen assistant commissioners, an appointment which the latter accepted, with the stipulation that he should not be called away from Rome. Meanwhile although Cicero was restored to his former dignity, there was a difficulty in the restitution of his property. The chief delay was about his house on the Palatine Hill, which Clodius had contrived to alienate, as he hoped, irretrievably, by demolishing the building and dedicating a temple upon the ground to the goddess Liberty. The senate therefore could only make a provisional decree, that if the college of priests discharged the ground from the claims of religion, the consuls should make a contract for rebuilding the house. The pontifical college was accordingly summoned to hear the cause on the last day of September, and Cicero personally addressed them in a speech which he himself considered one of his happiest efforts, and which he thought it a duty to place as a specimen of eloquence in the hands of the Roman youth. The speech, however, which now occupies a place among his works, under the title *Pro Domo sua apud Pontifices*, as well as those bearing the names of *De Haruspicum Responsis, post Reditum in Senatu*, and *Ad Quirites post Reditum*, all professing to have been delivered during this year, have been pronounced by the ablest critics to be spurious. The college gave a verdict in terms somewhat evasive; but the senate concluded the matter by a distinct vote in Cicero's favour; and the consuls immediately put the decree in execution by estimating the damage which had been done to Cicero's property. In this estimate his villas near Tusculum and Formiæ were included. But the estimation was far below what Cicero thought himself entitled to, and he attributed this injustice to the jealousy of the aristocracy, who, as they had formerly clipped his wings, so were now unwilling that they should grow again. Scarcely had the house upon the Palatine begun to rise, when a mob, instigated, according to Cicero, by Clodius, attacked the workmen, and afterwards set fire to the adjoining house, in which his brother Quintus lived. This riot was only one of many which at this time disgraced the city.

informer of Cicero's in the Catilinarian business, and as having endeavoured to implicate Cæsar on that occasion, is arrested as a conspirator against Pompey's life. He denounces some leading senators, including M. Brutus, as his accomplices, and is thrown into gaol. The next day, being again brought out by Cæsar, he includes Lucullus and Cicero in the charge. That same night he is strangled in gaol. While some declared he had been suborned and then murdered by Cæsar, others believed the charges made by Vettius, and attributed his death to the accused. The authorities are, Cic. *ad Att.* ii., 24; *Pro Sextio*, 63; *In Vatin.*, 10; Sueton *Jul. Cæs.*, 17 and 20; Plutarch, *Lucul.*, 42; Appian, *Bel. Civ.* 12-2; Dion, 37-41 and 38-9.

Milo, as well as Clodius, had his armed bands, and was avowedly seeking for an opportunity of murdering Clodius; while Cicero himself appears as a party in a forcible attack upon the Capitol for the purpose of destroying or carrying off the brazen tablets on which the law of his exile had been engraved. One of those who took an active part in the disturbances was P. Sextius, who, in his tribunate, had been instrumental in the restoration of Cicero. He was brought to trial for these disturbances the following year, when Cicero, in gratitude, undertook his defence, and obtained an acquittal; and, not satisfied with a mere verdict, he the next day made a furious attack in the senate upon a senator, Vatinius, who had been one of the chief witnesses against Sextius. Cicero was less fortunate in his defence of L. Calpurnius Bestia, who was prosecuted about the same time for bribery in the last election of prætors. In the same year he gratified his powerful friends Pompey and Cæsar by appearing as the advocate of L. Cornelius Balbus, a native of Gades, who had received the citizenship of Rome. The legality of his franchise was the subject-matter of the trial. It is somewhat strange to find Cicero so closely allied as he was at this time with Cæsar, on whom he had showered his abuse on nearly every occasion; but the fact and the disgrace of it are acknowledged by himself repeatedly in his letters to his friend Atticus. 'It is a bitter pill,' says he, 'and I have been long swallowing it, but farewell now to honour and patriotism.' There exist two other speeches delivered by him during the same year: one of these was in the senate, on the annual debate about the appointments to the provinces, and he employed the opportunity thus afforded in a furious attack on the private lives and public conduct of Piso and Gabinius, who had been the consuls at the time of his exile, and had assisted his enemy Clodius, and recommended their recall from the provinces they were then governing. He concluded his harangue by defending his alliance with Cæsar. The other speech just referred to was made in defence of Cœlius, a man who by his open profligacy and unprincipled conduct was notorious even among his countrymen. He was charged with the crime of procuring the murder of an ambassador from Alexandria, and also of attempting to poison a sister of Clodius. Cœlius was acquitted, and lived for many years on most intimate terms with Cicero; indeed the letters that passed between them constitute a whole book in his miscellaneous correspondence. On the return of Piso from his government of Macedonia, at the beginning of the following year, he complained of the attack which had been made upon him by Cicero in the debate about the provinces. Cicero replied to him in another invective, more violent than the former. One would hope that the speech purporting to have been spoken on this occasion was not genuine, for if it is, no one can read it without awarding to Cicero the prize among orators for coarseness and personality; and in fact he takes credit to himself, in his treatise on the perfect orator (*de Oratore*), for his invective powers.

In the spring of the following year he commenced the treatise on politics (*de Republicâ*), the loss of which the learned had long regretted, when Angelo Maio, in 1823, discovered a considerable portion of it in the Vatican library. The manuscript, which is of parchment, contained a treatise on the Psalms, in a small distinct character; but Maio perceived underneath traces of a larger type, in which he soon recognised the style of Cicero, and the matter, nay even the title, of the *de Republicâ*. But to return to the narrative, the greater part of the year 54 B.C. was employed by Cicero in his usual occupation of defending the accused. 'Not a day passes,' says he, in a letter to his brother, 'without my appearing in defence of some one.' Among others, he defended Messius, one of Cæsar's lieutenants, who was summoned from Gaul to take his trial; then Drusus, who was accused of prevarication, or undertaking a cause with the intention of betraying it; after that, Vatinius, the last year's prætor, and Æmilius Scaurus, one of the consular candidates at the time, who was accused of peculation in the province of Sardinia; about the same time likewise his old friend Cn. Plancius, who had received him so generously in his exile, and being now chosen ædile, was accused by a disappointed competitor of bribery and corruption. All these were, as usual, acquitted; but the orations are lost, excepting the one which he delivered in favour of Plancius, and a considerable fragment of that for Scaurus. This fragment is another of the discoveries of Maio, who found it in the year 1814, with some other fragments of Cicero's orations, in the Ambrosian library at Milan. As was the case with the '*De Republicâ*' the text of Cicero had been obliterated as much as possible from the parchment to make room for the Latin poem of the Christian writer Sedulius. Cicero's undertaking the défence of Vatinius, who had been always intimately allied with Cæsar, and on that account had on more than one occasion been the object of Cicero's abuse, his personal deformity being a favourite topic of raillery with the orator, at once surprised and offended the aristocratic party. They did not conceal from him their disgust, and Cicero found it necessary to make what defence he could of his political tergiversation in a long and ably written letter to his friend Lentulus Spinther, who was then governor of Cilicia (*Ad Fam.* i., 9). The compliment of an epic poem addressed to Cæsar was another proof of the change in his political views; but a still more decisive piece of evidence is furnished by his conduct in relation to Gabinius, who returned at this time from his government of Syria, and was immediately overwhelmed with public prosecutions. Cicero had not forgotten that Gabinius, as one of the consuls at the time of his exile, had supported his enemy Clodius: and he had openly avowed his opinion of his crimes in Syria—crimes, too, which, if we may believe Cicero, included murder, peculation, and treason, in every form: but he was willing to sacrifice both his public and his private feelings at the intercession of Pompey. In the first trial he was called as a witness against Gabinius, but had the prudence to put his evidence in such a form as to give the highest satisfaction to the accused. In the second he became still bolder, and appeared as his advocate, but was unable to save him from conviction, fine, and banishment. The speech delivered by Cicero is not extant, and probably was never published. There is preserved however the speech made by him on the trial of C. Rabirius Postumus, which was an appendix to that of Gabinius. The whole estate of the latter had proved insufficient to answer the damages in which he had been cast; and the Roman law, in such a case, gave the right of following any money illegally obtained to the parties into whose hands it had passed. Rabirius had acted at Alexandria as the agent of Gabinius with Ptolemy, and in that capacity was said to have received part of the ten thousand talents which the king had paid the Roman general as the price of his services. As this trial followed closely upon the preceding, and was so intimately connected with it, the prosecutors could not spare the opportunity of rallying Cicero for the part which he had acted. In the end of the year Cicero consented to be one of Pompey's lieutenants in Spain, and was preparing to set out thither, when he was induced to abandon the appointment on perceiving from his brother's letters, who was at that time serving in Gallia, that such a step would probably give umbrage to Cæsar, for the recent death of Julia had already broken the chief link which held Cæsar and Pompey together. At the beginning of the following year, news was received of the death of Crassus and his son Publius, with the total defeat of his army by the Parthians. By the death of young Crassus a place became vacant in the college of augurs, for which Cicero declared himself a candidate, and being nominated by Pompey and Hortensius, was chosen with the unanimous approbation of the whole college. This appointment had been for some years the highest object of Cicero's ambition; and the addition to his dignity was of service to him at this time, as he was putting forth all his influence to further the election of his friend Milo to the consulate. The constant disturbances in the city prevented the comitia from being held until the year was closed, and in the middle of January the murder of Clodius by one of Milo's gladiators, in the presence, and at the command too, of his master, placed Milo in a different position. The fury of the people at the death of their favourite broke out in the most violent excesses, which were only aggravated by the endeavours of Milo's powerful friends to screen him from punishment. These disturbances were at last quieted by the appointment of Pompey to the consulship, who was armed too with extraordinary powers by the senate, and finally Milo was brought to trial, condemned in spite of Cicero's eloquence, and banished from Italy. Cicero is said to have been so alarmed on the occasion, by the presence of the military whom Pompey had stationed around the court to prevent any violence, that his usual powers failed him; and indeed the speech which is found among his works, under the title of the defence of Milo, is very far from being that which he

actually delivered. In the two trials of Saufeius, one of Milo's confidants, which grew out of the same affair, Cicero was more successful: and he had soon after some amends for the loss of his friend in the condemnation of two of the tribunes, who had been their common enemies, for the part they had taken in the late commotions. One of these, T. Munatius Plancus, Cicero himself prosecuted, which is the only exception, besides that of Verres, to the principle which he laid down for himself of never acting the part of an accuser. It appears to have been soon after the death of Clodius that Cicero wrote his treatise 'On Laws' (de Legibus), three books of which are still preserved; but the work in its original form contained probably, like the 'De Republicâ,' to which it is a kind of supplement, as many as six books, for antient authors have quoted from the fourth and fifth. But the civil and literary pursuits of Cicero were soon interrupted by the demand for his services abroad. Among the different laws which Pompey brought forward for checking the violence and corruption which the candidates employed for the attainment of public office, was one which disqualified all future consuls and prætors from holding any province until five years after the expiration of their magistracies. But before the law passed, Pompey procured an exception for himself, getting the government of Spain and Africa continued to him for five years longer, while, to gratify Cæsar on the other side, Cicero, at the special request of Pompey, induced one of his friends to bring forward a law by which Cæsar's presence might be dispensed with in suing for the consulship in the following year. There was valid ground for this privilege being conferred upon Cæsar in the circumstances of the Gallic war, where the success of the Roman arms would have been seriously endangered by his absence. Thus Cicero and Pompey were the chief instruments in passing the very law which they afterwards declared unconstitutional and invalid, and so brought upon their country the horrors of civil war. As the magistrates of the time being were precluded from provincial government by Pompey's law, it was provided that for the next period of five years the senators of consular and prætorian rank, who had not held foreign command upon the expiration of their magistracies, should divide the vacant provinces by lot: in consequence of which, Cicero most reluctantly undertook the government of Cilicia, with which were united Pisidia, Pamphylia, Cyprus, and three dioceses, as they were called, of the adjoining province Asia. Thus Cicero found himself in the very position which it had ever been one of his chief objects to avoid, and his friends were the more uneasy as that quarter of the empire was threatened by the Parthians in revenge of the late invasion of their territories by Crassus. Under these circumstances Cicero was fortunate in having among his lieutenants two such men as his brother and Pontinius. The latter had established a high military reputation by his successes and triumph over the Allobroges, while the merits of Quintus Cicero as a soldier had been proved and acknowledged by Cæsar in Gallia.

Still the government of a province was suited neither to the taste nor the talents of Cicero, and he urged all his friends before his departure, as well as in nearly every letter he subsequently wrote, not to allow the command to be extended beyond the year which the law of Pompey required, or the year itself to be lengthened out by the caprice of the pontifical college; for the length of the Roman year at this time varied according as it was the pleasure of that body to insert more or less intercalary days in the month of February, and the Pontifices were guided in this not by any fixed rule, but by private motives, lengthening or shortening the year to favour a friend or injure an enemy.

Cicero left the city about the 1st of May, and on his arrival at Tarentum paid a visit to Pompey, with whom he had a conference on the serious aspect of affairs, and was assured by him that he was prepared for the dangers which threatened them. In the middle of June he proceeded from Brundisium to Corcyra and Actium, thence partly by land and partly by water to Athens, where he spent ten days, and then crossed in fifteen days to Ephesus, touching at several islands on the way. He had here a foretaste of the duties he would have to perform; for among the deputations which waited upon him at his landing was one from the citizens of Salamis in Cyprus, to lay before him their complaints against the extortion and cruelty of a Roman citizen named Scaptius, who had claimed from the city a large sum upon a bond, together with an accumulation of interest at the rate of forty-eight per cent.; and who had used the military authority he held under the late governor, Appius, to besiege the senate of Salamis in their council-room, until five had died of starvation. As Brutus had recommended the interests of Scaptius to Appius, who was his father-in-law, so he now laboured to place him in the same degree of favour with Cicero, and was seconded in this suit by the letters of Atticus; but the extortion raised Cicero's indignation, and he resisted the claims of Scaptius, though Brutus, in order to move him the more effectually, at last confessed what he had all along dissembled, that the debt was really his own, and Scaptius only his agent in it.

Cicero however was the friend of justice up to a certain point only, for when he refused the usurious interest, Scaptius in a private interview told him that though the principal was only one hundred and six talents, the Salaminians through some mistake believed it to be two hundred, and suggested that Cicero might safely give an award for the larger sum. Cicero himself gives us this anecdote in his letters to Atticus (v. 21), adding that he assented to the proposal, but was unable to effect the object because he found the Salaminians more precisely acquainted with the accounts than Scaptius had anticipated. This same Brutus, whose character is so commonly put forward as one of the finest examples of Roman virtue, had applied for the assistance of Cicero in another affair of a nature somewhat similar. The king of Cappadocia, whose empty coffers proved how dearly he paid for the protection of the Roman senate, owed him, he said, a very large sum of money. But Cicero was unable to render him the least assistance in the recovery of this money, as the king owed a much larger sum to Pompey, whose position in the political world at Rome gave him a higher claim, and yet was unable to pay him the full interest of the debt. These instances afford a good example of the miseries which resulted from the Roman form of provincial government. But Cilicia had felt these miseries in a degree more than usually severe under the late governor Appius, the traces of whose extortion were visible every where, and could only be compared, says Cicero, to the track of a wild beast. Indeed he found employment enough in healing the wounds which Appius had inflicted. Cicero appears not to have concealed his feelings upon this subject: at any rate the accounts which reached Appius led him to believe that Cicero was encouraging his enemies at Rome in their determination to bring him to public trial; nor could he believe the protestations of Cicero to the contrary, when he found his prosecutor Dolabella was about to be married to Cicero's daughter. He again expostulated, but Cicero replied to his complaints by disclaiming all knowledge of any such matrimonial negotiation, the falsehood of which is demonstrable from the letters which he wrote at the same period to Atticus. But Appius and Pompey were allied by the marriage of their children, and the latter induced Cicero to promise everything from the province that could be of service to the accused, so that the guilty governor was acquitted without difficulty. The military proceedings of Cicero were not of a very interesting nature. He had proceeded at once on his arrival in the province to the south-eastern frontier, which was threatened by the Parthians; but the Roman officer who commanded in the adjoining province of Syria had so completely occupied the attention of the enemy, that Cicero's troops never came in sight of them. Being unwilling however to let the army return into winter-quarters without effecting anything, he attacked some of the mountain tribes of Amanus, whose position had hitherto protected them, and took a number of prisoners; while his troops had a pretext for saluting him 'imperator.' He was also successful in the siege of a robber-fort called Pindenissus, for which his friends at Rome obtained him the honour of a public thanksgiving. His other services in Cilicia include nothing deserving especial notice, and he was happy when the year of his appointment expired, and enabled him to return to Italy. He landed at Brundisium towards the end of November, displaying his laurel-wreathed fasces, for his friends, and among them Pompey, flattered him with the notion that his eminent military services deserved nothing less than a triumph. But when he reached the neighbourhood of Rome on the 4th of January, he found matters of a more serious nature in agitation. The senate had just passed a decree that Cæsar should dismiss his army, and when M. Antony and another tribune opposed their veto to it, proceeded to that vote which gave the consuls and other magis-

trates a power above all the laws. The tribunes fled to the camp of Cæsar, who, considering this decree as equivalent to a declaration of war, advanced with a rapidity which destroyed all the arrangements of the senate. The consuls fled from Rome, accompanied in their flight by Cicero and the leading men of the aristocracy, in the hope of defending the southern part of the peninsula. With this view the principal senators had particular districts assigned to them, Cicero undertaking to guard the coast south of Formiæ and the country around Capua; but the rapid advance of Cæsar drove Cicero from his purpose. He disavowed the military engagement he had undertaken to fulfil; made different excuses for not joining Pompey in his march to Brundisium; and finally, when Cæsar made himself master of Corfinium, and by his magnanimous liberation of Lentulus Spinther, and other senators, gave the lie to those reports of his cruel intentions which his enemies industriously circulated, Cicero deemed it a favourable opportunity to open a negotiation with Cæsar, under the pretext of thanking him for his generosity to his friend Lentulus. In the middle of March Pompey sailed from Brundisium, abandoning Rome and Italy to his opponent. The return of Cæsar from Brundisium to the capital afforded an opportunity for an interview, in which it appears to have been stipulated that Cicero should remain in Italy, and observe a strict neutrality.

When Cæsar proceeded to Spain to oppose the Pompeian troops under Afranius, he left Antony in command of Italy, with especial directions to watch the movements of Cicero, who, residing upon the coast, occasionally showed symptoms of a disposition to slip off and join Pompey in Greece. This vacillation was not unobserved by Antony, and drew from him a monitory letter; but in vain. An account of some temporary success obtained by Afranius in Spain, magnified by himself and injudicious friends into a certain prospect of speedily destroying Cæsar and his army, led many of the wavering to fly from Italy to the camp in Greece. Cicero appears to have been one of these; at any rate he made his escape in the early part of June, and met with a cold welcome from the army of the senate. He was not present at the battle of Pharsalia, having stayed behind at Dyrrhachium, where he received the news of that decisive engagement, and, refusing to join those who determined to cross over into Africa with the intention of still maintaining the war, he again committed himself to the mercy of the conqueror, and landed at Brundisium at the end of October, B.C. 48. Here he passed many miserable months, the laurels upon his fasces drawing upon him an attention which he would gladly have avoided, while the news of Cæsar's difficulties in Egypt and the successes of the Pompeians in Africa again inclined the balance of the war. All this time he had received no intimation of pardon from Cæsar himself, though he was assured of his safety by Cæsar's friends. On the other hand, should the Pompeians ultimately succeed (and they were already talking confidently of coming over from Africa into Italy), he was sure to be treated as a deserter, for he well knew that while Cæsar pardoned even his enemies when they submitted to his power, it was a declared law on the other side to consider all as enemies who were not actually in their camp. After a long series of mortifications, he was cheered at last by a kind letter from Cæsar himself, and still more when Cæsar landed at Brundisium after his successful expeditions in the east, and gave him a reception which at once removed his fears and induced him to follow the conqueror to Rome. About the end of the year Cæsar embarked for Africa, and again the empire was in suspense; for the name of Scipio was thought ominous and invincible on that ground. Cicero, to relieve his mind, now shut himself up with his books, and entered into a close friendship with Varro, a friendship which was consecrated by the mutual dedication of their learned works to each other—of Cicero's 'Academic Questions' to Varro, of Varro's 'Treatise on the Latin Language' to Cicero. One of the fruits of this leisure was his dialogue on famous orators, called 'Brutus,' in which he gives a short character of the chief orators of Greece and Rome. But though the work was finished at this time, it was not made public till the year following after the death of his daughter Tullia.

He now parted with his wife Terentia, who had lived with him more than thirty years; and whatever may have been the causes or pretexts for this separation, he exposed his conduct to no little suspicion by marrying, almost immediately after, a young ward named Publilia, possessing much beauty and very considerable property, over which he had been placed as trustee by her father's will. Terentia subsequently married Sallust, the historian, and even after his death again entered into the married state once, if not twice. She is said to have lived to the age of 103. Amid these domestic troubles, Cicero perhaps found some consolation in the marked attention paid to him by Cæsar, who returned victorious from Africa in the summer of 46 B.C.; but any gratification he may have derived from this source must have been diminished by his consciousness of the offence he was giving to his former friends through his close intimacy with the dictator. The panegyric which he composed about this time in honour of Cato has indeed often been alleged as a proof of his being no temporizer; but if the treatise had come down to us, we should probably have found that Cicero had succeeded most happily in blending his eloge upon the conquered with a well-tempered flattery of the conqueror. That he possessed this happy and useful talent is apparent from the speech he delivered at this time in favour of Ligarius, and the defence of Marcellus might be put in evidence to the same effect, if there were not strong grounds for doubting the authenticity of the oration bearing that name. At the end of the year Cæsar was called away in great haste into Spain to oppose the sons of Pompey; and young Cicero requested his father's permission to go to Spain, that he might serve under Cæsar with his cousin Quintus, who was already gone thither. Cicero objected to his serving in arms against their former friends, and thought it more desirable that he should go to Athens to devote a few years to philosophy and literature. Soon after he had parted from his son, whom he was doomed never again to see, he was oppressed by the severest affliction, the death of his daughter in child-bed. Tullia had been thrice married; first to Piso, who died about the time of Cicero's return from exile, and then to Crassipes. For her third marriage with Dolabella both parties qualified themselves by a divorce from their consorts: and at the time of her death, arrangements for another divorce had been carried so far that her father was already applying for payment of an instalment upon her dowry.

In this new grief Cicero drew little comfort from the condolence of his friends. All the relief that he found was in reading and writing, and he composed a treatise 'Of Consolation' for himself, which was much read by the fathers of the Christian church, especially Lactantius, to whom we are indebted for the few fragments that remain. His domestic grief was completed by the misery of his ill-assorted marriage, which he was happy to dissolve after a union of less than a year. In this desolate condition he fled as usual to his books, and no period of his life produced a richer literary harvest. He has himself given us a list of the works which he wrote in this and the following year. (*De Div.*, ii., 1.) The *Orator* completed his rhetorical works, forming a sort of supplement to his three books entitled *De Oratore*, and the *Brutus*. His philosophical writings of this period were, the *Hortensius*, so called in honour of his deceased friend, in which he recommends the study of philosophy; four books in defence of the Academy, dedicated, as has been already mentioned, to Varro: five books entitled *De Finibus*, and addressed to Brutus, in which he contrasts the opinions of the different sects of philosophy on the subject of the *summum bonum;* the Tusculan disputations, in the same number of books, on a variety of points which involve the happiness of human life; three books on the Nature of the Gods; one on Divination, or the art of seeing into futurity; another on Fate: and the beautiful treatise on Old Age. These were followed by an essay on *Glory*, which has been lost since the invention of printing; the *Topica*, addressed to his friend Trebatius; and the *De Officiis*, which was dedicated to his son.

The publication of these works extended over the years 45 and 44 B.C. In the autumn of the former of these years Cæsar returned from Spain, and Cicero was induced to quit his retirement and come to Rome, where he soon after exerted his talents in the service of an old friend, Dejotarus, king of Galatia, who had incurred the displeasure of Cæsar by his firm support of the Pompeians, and indeed was charged with having formed a plot to assassinate Cæsar a few years before. Cicero failed in obtaining pardon for his friend; but his intimacy with the Dictator seemed daily to be increasing, when the Ides of March changed the whole face of affairs. Cicero was present at the scene of assassination in the senate-house, where he

had the pleasure, he tells us, of seeing the tyrant perish; but the conspirators were grievously disappointed in the results of their crime. As soon as the first stupor had passed away, the public indignation drove the murderers from Rome, and Cicero himself deemed it prudent to make a temporary retreat. He proceeded first to Rhegium, then crossing to Sicily, on the 1st of August he arrived at Syracuse, whence he sailed next day, and was driven back by cross winds to Leucopetra. Here he met with some people lately from Rome, who brought him news of an unexpected turn of affairs there towards a general pacification, so that he was induced to set out immediately on his return. He touched at Velia, where he had his last interview with Brutus, and arrived at the capital on the 31st. The senate met the next morning, but Cicero, not finding things in the favourable state which he expected, was unwilling to meet Antony, and excused himself from attending, as being indisposed by the fatigue of his journey. The next day Antony was absent, and Cicero delivered the first of those orations which he called Philippics, as being rivals of the invectives which Demosthenes directed against the king of Macedon. The violence of this harangue committed him with Antony, and he again retired for security to some of his villas near Naples, where he composed and published the second Philippic. This speech, if that name can be given to what was never spoken, was a furious invective, well charged with falsehood, against the whole life of Antony, and was supposed to have been the chief cause of Cicero's death. The departure of Antony for Cisalpine Gaul left Rome again open to Cicero, who returned there on the 9th of December, and ten days after delivered his third Philippic, the chief object of which was to procure the sanction of the senate to the late proceedings of Octavianus in opposition to Antony. Having effected this object, he passed into the forum and harangued the people upon the same subject in his fourth Philippic. The ten other speeches bearing this name were delivered from time to time in the senate or the forum, to excite the people of Rome against Antony and his friends; but the prospects of the oligarchy were finally disappointed by the treachery of Octavianus and Lepidus in joining their arms to Antony, and thus sharing the whole power of the state among them. The proscription which followed, though it can in no way be justified, was levelled against men who had been themselves assassins, or the avowed advocates and panegyrists of assassination. Cicero himself had lauded the murderers of Cæsar as the greatest benefactors of their country; nay, it is doubtful whether he was not himself privy to the conspiracy, though he may have wanted the courage to use the dagger himself; and afterwards when he found Antony in his way, he repeatedly expressed his regret that the conspirators had not served up one more dish at the glorious feast of the Ides of March. Cicero was at his Tusculan villa with his brother and nephew when he received the news of the proscription, and of their being included in it. He fled to Astura on the coast, where he found a vessel ready for him, in which he immediately embarked, but was compelled by the weather to land again the same day near Circeii. The following day he embarked a second time, but again landed at Caieta, whence he proceeded to his Formian villa. In the middle of the night his slaves informed him of the approach of the soldiers who were intrusted with the murderous commission; he made an attempt to escape in a litter, but being overtaken in a wood, the scene was speedily finished. The assassins cut off his head and hands, says Plutarch, and carrying them to Rome, presented them to Antony, who had them fixed up on the rostra in the forum. Cicero was killed on the 7th of December, in the year 43 B.C.

The works of Cicero have been repeatedly published in mass, as well as separately, but perhaps the best edition of his entire writings is that by Orellius. Of his separate works the following editions deserve particular notice. The 'Variorum,' as it is called, by Graevius, containing the Orations, the Letters ad Familiares and ad Atticum with one volume of his Philosophical Works. The notes of Manutius are exceedingly valuable. 2. 'De Divinatione et De Fato,' G. H. Moser. 3. 'De Legibus,' Moser et Creuzer. 4. 'De Natura Deorum,' by the same. 5. Ditto, by Heindorf. 6. 'De Republicâ,' by Moser. 7. 'Oratio pro Cluentio,' by Classen. 8. 'Pro Milone,' by Orellius, 1826. 9. 'Pro Plancio,' by Wunder. 10. 'Orationes Philippicæ,' by Wernsdorff. 11. 'The Orations,' by Garatoni, at Naples. To those who value a correct text, Wunder's Collation of the Erfurdt MS., published at Leipzig in 1827, will be of great service. The critical writings of Madvig of Copenhagen are also deserving of study, together with his excellent 'Disputation on Asconius.' Mention has been made of the doubts as to the genuineness of certain of the Orations. F. A. Wolf has examined the claims of the four Orations, 'Post Reditum in Senatu,' 'Ad Quirites post Reditum,' 'Pro Domo sua,' and 'De Haruspicum Responsis,' in a volume published at Berlin in 1801. In the following year he published an edition of the 'Pro Marcello,' with his reasons for believing it to be spurious. In regard to the letters ad Brutum, see BRUTUS. The student of Cicero's writings should also possess the account of his 'Life,' by Conyers Middleton. It has been freely employed in this article, but the strong bias of the author in favour of his hero has been throughout corrected from the writings of Cicero himself, more particularly his letters to Atticus, which having been written in confidence to an intimate friend, and never intended for publication, furnish a test for trying the character of the writer such as few public men could stand with impunity. Middleton has made two great errors in forming his notion of Cicero and the men who lived in his times. He has believed all that he has said of himself, and all that he has said of his enemies; and besides this, he has, with something of disingenuity, softened down these points where he has unintentionally borne evidence against himself. The translations of Cicero's writings in English are not of great merit. One of the best is Melmoth's translation of the 'Letters;' but his style is too florid. The French language possesses an excellent translation of the 'Letters to Atticus,' by the Abbé Mongault, accompanied by a Commentary no less excellent: and the German language has a still more valuable translation of all the 'Letters' in chronological order, by Wieland, with notes, and a number of historical chapters, which are tainted however with an undue partiality to Cicero. A most laborious and useful work for the student of these times, but still retaining much of the same prejudices, will be found in the 'History of Rome, in its transition from a republican to a monarchical form of government; or Pompey, Cæsar, Cicero, and their Contemporaries,' by Professor Drumann, of Königsberg. Two volumes have alone appeared, which descend no lower than the letter C (Cornificii), for the work is drawn up in an alphabetical order according to the gentile names.

CICERO'NE, a name given by the Italians, especially of Naples and Rome, to the guides who show travellers the antiquities of the country. It was a common saying in Italy, when speaking of a learned or eloquent man, 'è un Cicerone,' 'he is a Cicero;' and the poor guides and valets de place, who, generally speaking, are neither learned nor eloquent, and often make ridiculous blunders on the most trivial subjects, have now usurped the name of Cicerone.

CICHORA'CEÆ. [COMPOSITÆ.]

CICINDE'LIDÆ, a family of Coleopterous insects, of the section *Adephaga*, and sub-section *Geodephaga*. The true carnivorous beetles are included in a large section called *Adephaga*, all the species of which group may be distinguished by their having six palpi. The section Adephaga is divided into two sub-sections, the *Geodephaga* and the *Hydradephaga*. The former derive their subsistence on the land, and the latter in the water. The structure of the insects in these two groups, in order to suit them to their habits, is therefore of necessity essentially different (as far as secondary characters of form, &c. are concerned), the former being formed for running, and the latter for swimming. In the number of joints to the tarsi (which is always five), and the antennæ (which is eleven), and the parts of the mouth, they are however alike; these latter are generally considered primary characters. To make ourselves more clearly understood, we may compare the section *Adephaga*, among beetles, to the *Carnivora* among the *Mammalia;* the *Geodephaga* to the bears, weasels, dogs, and cats; and the *Hydradephaga* to the seals and otters. We may again carry our simile further by comparing the *Cicindelidæ* to the cats or tigers, the beetles belonging to this family being most pre-eminently voracious.

The *Cicindelidæ* are divided into two groups; those species in which the emargination of the mentum is furnished with a tooth or pointed process in the middle, and those in which this process is wanting. To the first group or section belong the genera *Manticora, Platychile, Mega*

cephala, Oxycheila, Iresia, Cicindela, Dromica, Euprosopus, and *Ctenostoma*; and to the second section belong the genera *Therates, Tricondyla*, and *Colliurus*.

The typical genus of the family we are treating of is *Cicindela*, and in this genus, as is generally (if not always) the case in typical genera, the species have a wide geographical range, and are very numerous. Taking Dejean's Catalogue as our guide, we find the genus Cicindela containing upwards of 200 species, and the number of species contained in all the other genera taken together is about 40. The species of Cicindela are found in every quarter of the globe; whereas the other genera mentioned are very local; they are all extra-European, some being entirely confined to Africa, several to South America, and others to India.

The technical generic characters of Cicindela are:—labial palpi moderately long, in this respect not exceeding the maxillary palpi; last joint of all the palpi truncated at the apex, and about the same width as the preceding joints; three basal joints of the anterior tarsi dilated in the males and covered beneath with a velvet-like substance.

As regards the form, the most striking character of the Cicindelæ is the great projection of the eyes; the jaws are very long and sharply pointed, and furnished on the inner side with three tooth-like processes; the head is generally equal in width to the thorax, or sometimes exceeding it; the thorax is either somewhat cylindrical, or rather depressed and nearly square, and is transversely indented before and behind. The elytra are generally rather depressed and almost double the width of the thorax; the legs and antennæ are long and slender.

The colouring of the Cicindelæ is generally rich and metallic; the upper surface is usually more or less shagreened, and hence is not glossy; the under surface is glossy, and generally sparingly covered with hairs of a pale colour.

With respect to their habits, it has been before remarked the Cicindelæ are extremely voracious; we may add, they are very active, and almost always take to the wing when approached, and hence are caught with difficulty; their flight is however short. The situations which they inhabit are generally sandy plains* or heaths, and sometimes the sea-shore or the shores of rivers, &c.; but some of the other genera of the Cicindelidæ, from their form and colouring,* appear to be more particularly adapted to these last-mentioned situations.

Six species of the genus Cicindela have been found in England, of which the most common is *Cicindela campestris*. This insect is found more or less abundantly throughout the country, and is very common in the neighbourhood of London; it is rather more than half an inch in length, and of a bright green colour; the anterior and posterior margins of the thorax, the legs, and the basal joints of the antennæ are of a rich copper colour; the under side of the body is glossy and of a blue-green colour; the wing-cases are each adorned with six cream-coloured spots, one on the shoulder or outer angle, another at the apex, three on the outer margin at nearly equal distances apart, and one on the disc, a little lower down than the third marginal spot from the shoulder.

The larva of this insect is very well known, and may be found almost at any time during the summer in sandy situations: it lives in cylindrical burrows, varying from six inches to a foot in depth, these burrows being excavated by itself. Like the perfect insect, it is very voracious, and in fine weather may be seen with its head on a level with the surface of the soil, lying in wait for any insect which may happen to crawl over its cell. Its form is remarkable: the head is very large and slightly concave; the jaws are also large and curved upwards; the body is furnished with six legs, attached to the three first segments, and is humped near the middle of the back, at which part there are two tubercles, each of which is furnished with a horny hook; these hooks, and the body being naturally of a bent shape, enable the animal to sustain its position at the top of the cell, or to ascend and descend very quickly: the concave head and the recurved mandibles form a kind of natural basket in which the soil is brought to the mouth of the cell during the progress of its excavation.

Four other British species of the genus Cicindela, *C. sylvatica, maritima, aprica*, and *sylvicola*, have white or cream-coloured spots in the same situations as in *C. campestris*, but they are joined together in pairs; the two towards the base of the wing-case form a curved dash which surrounds the shoulder; the one on the disc of the elytron and that at the margin nearest it are also joined, and form a bent fascia, and the two at the apex form a bent dash, which follows the outline of that part of the wing-case. This disposition of the markings, viz., a lunular spot at the shoulder, a bent fascia in the middle, and another lunular spot at the apex of the elytron, is that which is most commonly found in the species, and the most common colour is brownish bronze; such is the colour of *C. maritima, riparia*, and *sylvicola*; the latter sometimes varies to a green hue

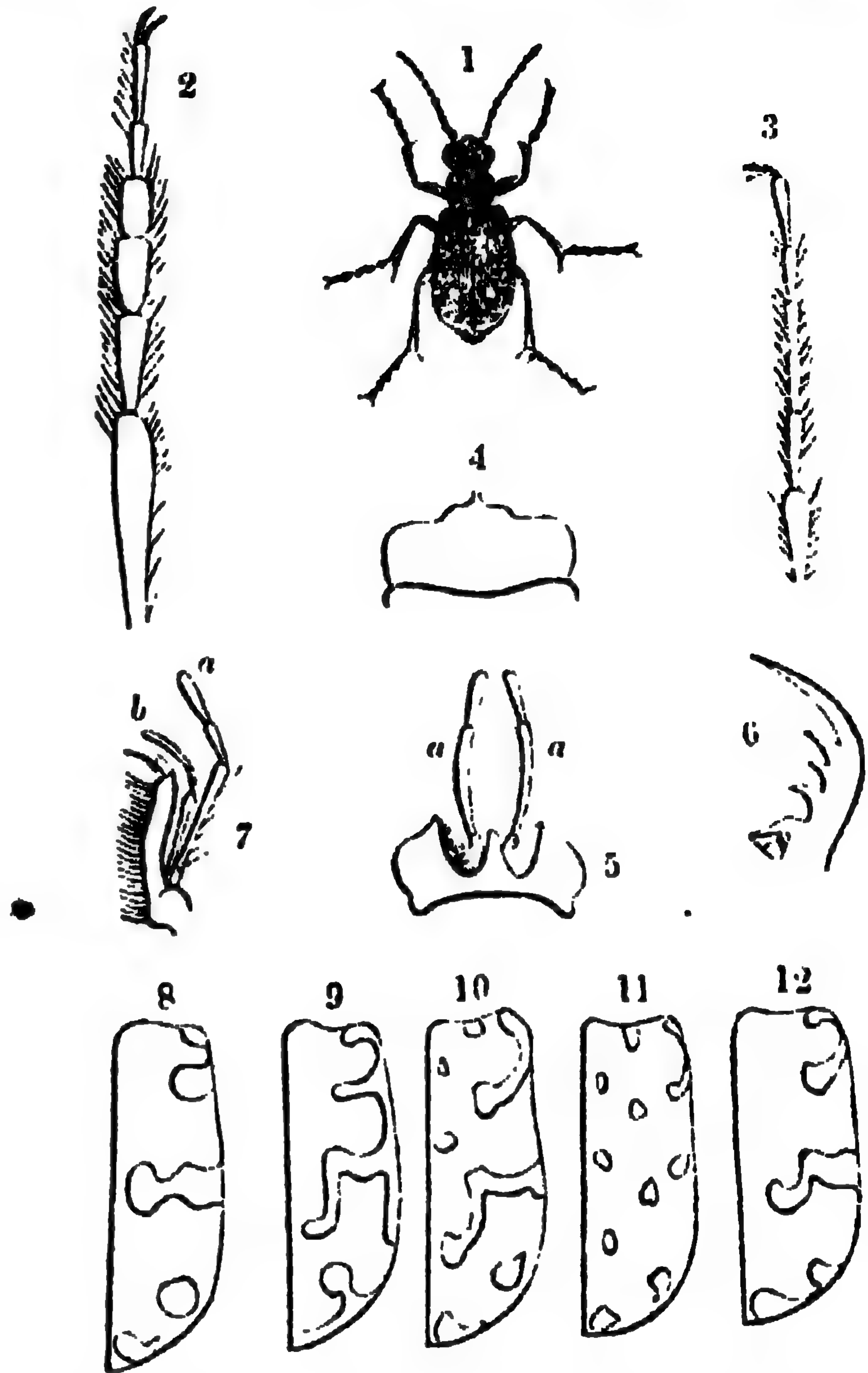


Fig. 1, Cicindela campestris; *fig.* 2, anterior tarsus of the male; *fig* 3, do. of female; *fig.* 4, labrum of another species of Cicindela; *fig.* 5, mentum of do; *a, a*, labial palpi; *fig.* 6, mandible; *fig.* 7, maxilla, *a* external maxillary palpa, *b* internal maxillary palpa; *figs.* 8, 9, 10, 11, and 12, wing-cases of five different species of Cicindela, to show the variation in the markings.

In some exotic species of Cicindela the elytra are adorned with numerous spots; eleven is the greatest number we have found; of these, however, three or four are often obliterated, and the others are joined (two or three together), so as often to form three irregular-shaped oblong dashes or fasciæ.

In some instances the markings run one into the other, so that there is more white than ground colour; and in one species, now before us, the wing-cases are entirely white. These markings vary but slightly in individuals of the same species.

The Cicindelidæ, in most arrangements of insects, form the first family of the Coleoptera.*

CICISBE'O, in Italian, means a gallant, a man who courts the ladies. The term is also applied to a knot of ribands, which used to be worn appended to the hilts of swords or to the handles of fans. (*Dizionario della Crusca.*) In like manner a Cicisbeo is a man who hangs upon a lady, is constantly by her side and at her beck, and attends her wherever she goes. This derogatory custom has long prevailed with married ladies, especially in the towns and among the fashionable classes, in Italy and other southern countries; but the country people and the humbler class of citizens have generally remained free from it. Even in the towns the practice is losing ground of late years. The

* The colouring of insects, as well as their form, often affords a clue to their habits.

* We have entered more than usually into detail in this article, because the insects here treated of constitute a group in which cabinets are very rich in species; it therefore affords good illustrations of various points of general application in entomology which it may be hereafter necessary to refer to. Whilst writing this, and in endeavouring to trace the markings of the various species of Cicindela to one source, we have discovered (upon referring to other families of the Coleoptera also) that in most beetles, where markings occur, they may be traced to variations of one pattern.

words *cavalier servente* and *patito* are also used in the same sense.

CICOGNA'RA, COUNT LEOPOLD, was born at Ferrara, November 26, 1767, and, although the inheritor of considerable wealth, began early to distinguish himself by his application to study. While yet a youth he made considerable proficiency in mathematics and physics, whereby he recommended himself to the notice of Spallanzani, Scarpa, and many other eminent individuals at the university of Pavia. Having completed his course of studies there he proceeded to Rome, where he occupied many years not only in studying the great works of art, but likewise in practising himself both in drawing and painting, for which he had almost from his boyhood manifested more than ordinary talent. After visiting Naples and Sicily, in which latter country he published, at Palermo, his first literary effort, a poem, entitled *Le Ore del Giorno*, he successively visited Florence, Milan, Bologna, and Venice, for the purpose of making himself thoroughly acquainted with the various treasures of art in those cities. In 1795 he fixed himself at Modena, and during the twelve following years appears to have given much of his attention to public affairs, having been for some time minister at the court of Sardinia. He resigned his post in 1808, when he was made president of the Academy of the Fine Arts at Venice; an office for which he was well qualified no less by the public-spirited zeal with which he discharged it than by his knowledge of art itself and the literature belonging to it. From this epoch in his life may be dated the commencement of his career as a writer, during which he enriched the branch of literature just mentioned by many important works. In that same year (1808) he published a treatise on 'The Beautiful' (*Il Bello*). This was succeeded by his great work, 'The History of Modern Sculpture' (*Storia della Scultura dal suo risorgimento in Italia al Secolo di Napoleone*), an undertaking to which he had been urged by his friends Giordani, D'Agincourt, and Schlegel. It is in three folio volumes, the first of which appeared in 1816, and the last in 1818, and contains about 180 outline plates, exhibiting a vast number of subjects from the earliest period—the age of the Pisani and Donatello—to that of Canova, to a notice of whose works the whole of the seventh or last book is devoted. Although fastidious criticism has taxed it with some defects, it is undeniably a performance of great research and erudition, bringing down to the present century the history of the art from the point at which it had been left by D'Agincourt, who himself had taken it up where Winckelmann had quitted it. Besides a vast body of information as to the professed subject, this work also embraces much subsidiary matter of great interest, particularly the descriptive and historical notices of St. Mark's at Venice, the cathedrals of Milan and Orvieto, St. Peter's and many other Basilicæ.

His next publication was a catalogue raisonné, in two thick 8vo. volumes, of his own library, an immense collection of works in every department of the fine arts. This is a most valuable addition to bibliography, and shows that Cicognara spared no cost in the pursuit of his favourite studies. He likewise produced a work entitled *Memorie per servire alla Storia della Calcografia*, and numerous articles relative to subjects of art and artists, printed in various journals, but never, unfortunately, given afterwards to the world in a collective form. Even had he produced none of the works above enumerated, the name of Cicognara would have been transmitted to posterity with honour by the two splendid architectural volumes, entitled *Le Fabbriche piu Cospicue di Venezia*, 1815—20, of which the greater share of the literary part and the chief conduct of the work belong to him, although he was assisted in it by Diedo and Selva, who furnished the accounts of many of the buildings. It is illustrated with 250 engravings, wherein will be preserved all the most interesting structures of Venice when the now-mouldering originals shall have fallen into utter decay.

He died at Venice, of a disease of the lungs, March 5, 1834, and his obsequies were performed with great solemnity in the cathedral of St. Mark.

CICO'NIA. [STORK.]

CICU'TA VIRO'SA, or WATER HEMLOCK, is a wild poisonous plant of the Umbelliferous order, found occasionally by the sides of ditches and ponds. It is a perennial plant, with a large fleshy white root covered externally with fibres, and divided internally into several low chambers filled with a milky or yellowish juice. The stem is erect, hollow, cylindrical, striated, and two or three feet high. The leaves, especially the lower ones, are decomposed or thrice-pinnated; the leaflets are narrow, lanceolate, deeply and irregularly toothed. The umbels are usually destitute of involucre, or, if they have one, it is nothing but a single linear bract; the partial umbels have several such bracts. The flowers, which are white, have the ordinary umbelliferous structure. They are succeeded by globular double fruit, crowned by the style and the five teeth of the calyx, and showing on each of their convex faces five salient simple angles. Its medicinal properties are similar to those of common hemlock [CONIUM], but more energetic. Its roots have been mistaken by children and country folks for parsnips, and have been eaten with fatal consequences.



[Cicuta virosa.]

1. A flower. 2. A young fruit.

CICUTA. [CONIUM.]

CID. The adventures of this famed Castilian hero are nearly as much involved in fable and romance as those of our King Arthur and his Knights of the Round-table; nor is it easy, at this distance of time, to separate the truth from the exaggeration of tradition and the inventions of ballad-writers. Ferreras and one or two other Spanish writers think, however, they have established the following facts.

The Cid (from the Arabic *El Seid*, 'the Lord'), so called by the Moors of Spain whom he subjugated by his victories, was born at Burgos somewhere about 1040. His real name was Rodrigo Diaz de Bivar. He attached himself to Sanchez II., king of Leon and Castile, whose life he once saved in battle. At the siege of Zamora Sanchez was treacherously slain, and his brother Alfonso, the next in order of succession, was suspected of the deed. The Cid insisted that, before taking possession of the vacant throne, Alfonso should purge himself by taking an oath of his innocence of his brother's murder; and when the rest of the nobles hung back, he alone exacted and made the king repeat the vow, to which he added the most awful maledictions in case of perjury. After such a step he could expect little court favour, and the state of Spain encouraged his propensities to war and adventure. His life was a continued series of combats with the Moors, who occupied by far the largest and richest parts of the country. He fell upon them in Aragon, burning, plundering, and slaughtering wherever he went; he took Alcacer, and making that place his strong-hold, he was gradually joined by a numerous band, half patriots, half freebooters, with which

he made innumerable incursions into the neighbouring territories of the Moors. Still gathering force he penetrated to the district of Ternel, at the south-western extremity of Aragon, and there established himself in a strong fortress on a rock, which is still called 'La Peña de el Cid' (the rock of the Cid). By the sudden death or murder of the Moorish lord of Valencia, he was encouraged to extend his incursions into that province, and to the shores of the Mediterranean. Here, too, he was eventually enabled to establish himself. After a long siege he took Valencia, the capital city, and held it until his death, which happened about 1099.

It appears the Cid really had a wife named Ximena, the Chimène of the celebrated French tragedy 'Le Cid,' but the story of his affecting courtship, and the struggle and contrast of affections in the heart of his mistress, are mainly inventions of Corneille. The Spanish Chronicles and ballads, from which the French tragedian took the notion of his plot, or from a drama founded upon them, do indeed relate that the Cid had killed Ximena's father; but they destroy all interest in the heroine by saying that after her father's death, and before any tender addresses on the part of his slayer, she earnestly begged the king to marry her to the Cid, 'because,' she is made to say by these naïve writers, 'I am quite certain that his possessions will one day be greater than those of any man in your dominions.'

The original 'Cronica de el Famoso Cavallero Cid Ruy Diaz Campeador' is supposed to have been written in the 13th century, about 150 years after the hero's death. Mr. Southey, in his curious work, makes use of a printed edition of 1593, and says the first and only other edition was printed in 1552; but there is a copy of an edition in the library of the British Museum which bears the date of 1541.

The 'Poema de el Cid,' which is believed to contain rather more historic truth than the prose chronicle, was written about the middle of the 12th century, or only some 50 years after the Cid's death. The author has been called the 'Homer of Spain,' but his name has not been preserved. Mr. Southey says his work is unquestionably the oldest poem in the Spanish language, and (in his opinion) the finest beyond all comparison. This praise is perhaps extreme, but the 'Poema' contains some powerful passages, and is highly interesting from its undoubted antiquity.

Besides this poem the Spaniards have an immense number of romances and ballads relating to the exploits of the national hero. No fewer than 102 of these are in the real old style of the 13th and 14th centuries; many are evidently more modern, and many more have never been printed. In some of these ballads the wonderful achievements of Bernardo de el Carpio, Ferran Gonzalez, and the rest of the twelve peers (for Spain had her twelve *peerless* knights, as well as Britain and France) are interwoven with the adventures of the great Cid. An ample notice of these different works will be found in Mr. Southey's 'Chronicle of the Cid,' 1 vol. 4to., 1808.

CID'ARIS. [ECHINIDÆ.]

CIDER, or CYDER. A word used to signify the juice of apples expressed and fermented. The article APPLE contains a general view of the culture of apple-trees; what is here stated as to the management of apple-trees has special reference to the English cider counties.

In the Hereford district (under which name we shall refer to that county with the adjoining cider districts in Gloucestershire, Monmouthshire, and Worcestershire, while by the name of the 'Devonshire district' similar portions of Dorsetshire, Somersetshire, and Cornwall will be distinguished), where the varieties of cider-apple cultivated are far more numerous than in any other part of England, the New Foxwhelp (a seedling from the old), the Wilding, the Cherry Pearmain, the Yellow and Red Norman,* are among the many sorts that are preferred. It appears to be almost immaterial whether the crab-stocks are grafted before or within a short time after they are removed from the nursery to the orchard in which they are to stand. In Herefordshire it is usual to insert the grafts about six feet from the ground, and to plant the trees about 66 feet between the rows, and 36 between the trees where the soil is rich; if the soil is poor, less distance is allowed, as the trees will not spread with so great vigour. This seems a preferable method to that practised in Devonshire, where the grafts are inserted at from three to four feet from the ground, and the trees planted about 16 feet apart. The advantage which in Devonshire is gained from the trees being less exposed and broken by the wind, and perhaps from a greater produce of apples, is more than counterbalanced by the entire loss of the land, usually a wilderness of weeds, into which horses run in the winter, and calves in the spring, but where neither grown cattle nor the plough can ever be admitted. In the Devonshire district, the situations chosen for orchards are generally hollow dells or shelving banks, in the neighbourhood of the farm-houses, the land on which they are planted being put to little other use; while in the Herefordshire district the choice is determined chiefly by the quality of the soil, without reference to the position of the farm-house. In their youth the trees do comparatively little injury to the land, while they receive considerable benefit from the frequent stirring by the plough of the soil round their roots, so that newly-ploughed lands, or hop-yards which may be again laid down to grass as soon as the trees have acquired some strength, are spots frequently chosen. This practice is agreeable to the very sensible instruction given by Mr. Marshall, *Rural Economy of Gloucestershire*:—'Plant upon a recently broken-up worn-out sward; keep the soil under a state of arable management until the trees be well grown, then lay it down to grass, and let it remain in sward until the trees be removed and their roots decayed, when it will again require a course of arable management.' (vol. ii., p. 302.)

In February or March, or, where the soil is light, in October or November, holes should be dug about six feet in diameter, each being adapted in depth to the root of the tree that it is to receive. The best earth, with the turfs, if the spot is grass land, should be thrown into the bottom of the hole, and the roots of the tree separated with the hand in horizontal layers with the richest mould between them; all the earth may then be thrown in and firmly trodden down. If the stocks are strong, the best and cheapest method of protection from the injuries of cattle is a frame of willow staves, about six feet long, cleft as those used for the bars of hurdles: these should be hammered about six inches into the ground, round the tree, and as near it as can be done without injuring the roots, perhaps three inches from it: the staves should then be nailed together with two bands of narrow iron hooping, one a foot and a half from the bottom, another at a like distance from the top, at the same time binding them round the tree as tightly as can be done without injury to the bark. Where the stocks are not strong, the best fence is 'one large post, slit with a saw and placed flat-way, with the faces to the plant, and about two feet apart, with rails on each side, nailed upon the edges of the posts.' (Marshall.) In the Hereford district these fences are much used; they are cheap and effectual, and from their narrowness offer little impediment to ploughing and other purposes of agriculture, which are here carried on as much in the orchards as in any other lands.

Very little attention is paid to enriching the soil round the trees when once they have been planted. In Devonshire it is common to see the weeds which are cropped in the orchards, heaped near the stem, there to decay and nourish the roots; and in Herefordshire the more careful planters cause the earth to be dug once a year round trees that have been recently planted: neither is there so much care taken with the trees themselves when they have once grown strong, as the benefits which have been derived from a better system of management would warrant. In by far the largest proportion of orchards, with the exception of gathering the fruit, nothing is done to the trees from the beginning of the year to the end. To remove superfluous wood by judicious pruning (an art of which many that practise it are most mischievously ignorant), to remove part of an excessive crop of fruit, to cleanse from moss and mistletoe, which latter in frosts forms excellent food for sheep, are practices too frequently neglected.

The fruit of the different varieties of apple ripen at different times of the year, earlier or later, according to the season. Among the earliest are the Codling and American Must, which begin to fall from the trees at the end of September; and while the majority attain their maturity about the end of November or the middle of the following month, there are some from which the apples will not fall until six or eight weeks later. The customary method of picking the fruit is by striking the trees with poles, provincially called 'poulting,' and then gathering the fallen

* It has been objected to 'Norman' cider, that it will not carry to a distance without damage.

apples; but though this practice is almost universal it is frequently mischievous, from the young bearing wood being broken by the violence that is used. It is better economy to pay a small extra price for collecting the fruit which falls at several times, than to injure the trees by knocking down all the fruit, the unripe as the ripe, to save a few shillings. The apples will fall by degrees, and at intervals a boy may be sent into the trees to shake the branches: in all practicable cases the use of the pole should be avoided. When the apples have been gathered, each sort by itself is collected into heaps, about ten inches deep, where they remain for a month, or more, until they become mellow; they are then ready for the mill.

Cider is manufactured with very rude machinery, by the following process. The apples are thrown into a circular stone trough, usually about eighteen feet in diameter, called the *chase*, round which the *runner*, a heavy circular stone, is turned by one or sometimes two horses. When the fruit has been ground until the rind and the core are so completely reduced that a handful of 'must' when squeezed will all pass without lumps between the fingers, and the maker sees from the white spots that are in it that the pips have been broken, a square horse-hair cloth is spread under a screw-press, and some of the must is poured with pails upon the hair, the edges and corners of which are folded inwards so as to prevent its escape. Ten or twelve of these hairs are piled and filled one upon the other, and then surmounted with a frame of thick boards.* Upon this the screw is slowly worked down by a lever; and with the pressure, a thick brown juice exudes from the hairs, leaving within them only a dry residue, which, in years when apples are scarce, is sometimes mixed with water, ground again, and the liquid pressed out as before. This latter product is called 'water cider,' a thin unpalatable liquor, which is given to the labourers early in the year.

The cider is received by a channel in the frame of the press upon which the hairs stand, emptying into a flat tub called a 'trin.' From the trin it is poured with buckets or 'racking cans' into casks, placed either out of doors, or in sheds where there is a free current of air. In about three or four days, more or less according to the heat of the weather, the liquor usually will ferment; the thick heavier parts will subside as a sediment at the bottom of the cask, and the lighter become bright clear cider. This should then be 'racked' or drawn off into another cask, and the sediment be put to strain through linen bags, and what oozes from them should be restored.

It is during the fermentation that the management of cider is least understood, and there is the greatest hazard of injury. It is necessary also to know what fruit will by itself make good cider, which kinds should be ground together, and what proportions should be mixed. But it is in the preservation of strength and flavour after the cider is ground that the principal difficulty consists: *slight* fermentation will leave the liquor thick and unpalatable; *rapid* fermentation will impair both its strength and durability; *excessive* fermentation will make it sour, harsh, and thin. Other things being equal, that cider will probably prove the best in which the vinous fermentation has proceeded slowly, and has not been confounded with the acetous. The remedies used in cases of cider not clearing are either yest or the addition of cider in a state of fermentation, isinglass, eggs, or a quart of fresh blood stirred up with the liquor, in which last case it is to be racked on the following day; these do not always prove effectual. But the common evils are excess or rapidity of fermentation; and if a better quality than farm-house or 'family drink' is sought, cider requires so much care to prevent its being spoiled, that the best and most careful makers frequently have it looked at during each night for some weeks after it is made; and if the bubbling hissing noise, the sign of fermentation, becomes frequent or too loud, the liquor is *immediately* racked off into another cask: this check often requires to be repeated several times; but although at each racking some portion of the strength will be lost, the body, flavour, and sweetness will chiefly be retained. It is not the habit of the farmer to add sugar, treacle, brandy, or any colouring matter to the liquor; it is only adulterated in the hands of cider dealers and publicans, who will not lose a hogshead, and if one has turned sour, or has been otherwise damaged, it must be 'doctored,' in order to render it marketable.

At the beginning of January the cider is moved into cellars, where by large growers it is frequently stored in casks of great capacity, containing 1000, 1500, or even 2000 gallons; these are cheaper in proportion than smaller vessels, and are thought to preserve the cider better. In March the liquor is bunged down; it is then fit for sale, and may be used soon afterwards, though it will greatly improve by keeping. If bottled cider is required, it should be bottled and wired in the September or October after it is made; some persons prefer an earlier time, the end of April or the beginning of May; a greater degree of effervescence is thus attained, but a considerable loss accrues from the number of bottles that will burst.

In 1830 the tax upon cider of ten shillings a barrel was taken off (M'Culloch, *Dic. Com.*), and in the same year an Act was passed allowing any person to sell cider upon the payment of 2*l.* 2*s.* annually for a licence from the Excise. This act was amended in 1834, and a licence for the sale of cider is now (1836) granted by the Excise to an application signed by six ratepayers of the applicant's parish, the payment being 3*l.* 3*s.* if the liquor is to be drunk on the premises, 1*l.* 1*s.* if it is not. These alterations have necessarily added greatly to the consumption; but the increase of orchards during the last twenty years, and the late productive seasons, have fully supplied the demand. During the years 1833-4-5 the price in the hands of the grower may be thus estimated:—Of the best cider, from 1*s.* to 1*s.* 6*d.* per gallon; good, from 10*d.* to 1*s.* per gallon; family cider used by farmers and in public-houses, from 4*d.* to 10*d.* per gallon; 'drink' for labourers, from 2½*d.* to 6*d.* per gallon. These prices amply remunerate the farmer, who, in many instances, might increase his profits by a diminution of the cost of production. It cannot certainly be supposed that small growers can go to the expense of procuring much machinery; nevertheless the extreme clumsiness of the present wasteful system would fully warrant larger owners in erecting suitable buildings and apparatus. It is true that some improvements have been made, that larger mills are used, that in the press an easily worked iron screw has been substituted for an awkward wooden one; but far more remains to be effected. If the mill was placed upon a first floor, which could easily be done in a building erected against a bank, or having an inclined plane, so that horses might enter at that height, all lifting of the cider from the trin might be saved, as a pipe might be carried from the press into casks in the cellars underneath. Again, if the casks in the cellars were placed upon stages, manual labour in racking might be dispensed with, and waste from spilling saved, since a pipe from a hogshead upon a high stage would empty the liquor into a cask on a lower. No use, again, is made of the siphon, a cheap instrument within the reach of any farmer's purse, which would no doubt be serviceable and economical.

The quantity consumed by workmen is very large: two or three quarts a day is the usual allowance given in Herefordshire by masters; and in harvest-time many labourers drink in a day ten or twelve quarts of a liquor that in a stranger's mouth would be mistaken for vinegar; they do not like sweet cider. Notwithstanding so great a quantity is consumed, there do not appear to be any diseases peculiar to or very general in cider countries: idiocy and rheumatism have been stated to be very prevalent in such districts; but even if this is true, cider-drinking has in no way been proved to be the cause. It is remarkable that during the continuance of the cholera in this kingdom, there occurred very few cases in Devonshire, and none in Herefordshire, although the sickness reached the adjoining counties at the time of harvest, when cider is drank to excess.

Cider of good quality is made in Ireland, in the counties of Waterford and Cork; in Normandy, whence we have many of our best apples; in Belgium; and of inferior quality in Germany. It is also made in abundance, and of excellent quality, in many parts of the United States.

CIGAR. [TOBACCO.]

CIGNA'NI, CARLO, was born at Bologna, May 15, 1628. His father was a notary, but claimed his descent from an old Ghibelline family of Florence, who had been driven from their native city by the Guelphs. Carlo, who showed an early taste for painting, was put under Giambatista Cairo for instruction. He soon surpassed his master, and was removed to the care of Albani, under whom he

* This is the process in the Hereford district. In Devonshire a lever press is used, and 'reed,' unthrashed straw, is spread in layers in the place of hairs. The method used in the south of France for expressing oil from olives is identically the same.

rapidly rose in reputation and success. He subsequently enlarged his style of painting by a careful study of the works of Correggio and Annibal Carracci, from whom he learned the art of giving size and space to his pictures, by means of a powerful and skilful use of *chiaroscuro*. Le Brun is said to have been deceived by a picture of his, and to have taken it for the work of his great countryman. Cignani had a singular degree of prosperity; commissions crowded upon him, he enjoyed the friendship and correspondence of many of the reigning princes of his time, and acquired great wealth. He was also made a count by Ranuzio II., his native sovereign.

Being invited to paint the Duomo of Forli, he removed thither with his family, and resided there for the remainder of his life. While Forli was occupied by some German troops during the war between the pope and the emperor, Cignani presented a picture to the commander of the forces, who in return, besides a handsome gift in money, issued an extraordinary order to his troops to refrain in every way from molesting the good people of the city. The citizens testified their gratitude to Cignani by enrolling him among their nobility. In 1708, when the Clementine Academy was instituted, Cignani was elected president. He died September 6, 1719, leaving two sons, one of whom, Felice, was a painter.

He painted an infinite variety of subjects, sacred, classical, and even comic. His colouring is pleasing and brilliant, and his finish most elaborate. His chief work is the Duomo at Forli, an immense composition, ingeniously disposed, which represents the assumption of the Virgin. (Zanotti; Zanelli.)

CILICÆA. [ISOPODA.]

CILICIA (Κιλικία), a country of Asia Minor, forming part of Anatolia. The antient boundaries were, on the north the Taurus, which separated it from Cappadocia and Lycaonia, on the south the Mediterranean sea, on the east Mount Amanus, which separated it from Syria, and on the west Pamphylia. According to Herodotus (v. 52), the Euphrates was the boundary of Cilicia and Armenia. Cilicia antiently comprised two divisions, the names of which were derived from their physical character. The west division was called mountainous or rough Cilicia (Κιλικία τραχεῖα, or, Herod. ii. 34, ἡ ὀρεινὴ Κιλικίη, Cilicia aspera), and the east division, level Cilicia (Κιλικία πεδιάς, Cilicia campestris). Many attempts have been made by antient and modern writers to account for the name Cilicia; the Greeks derived it from Cilix, son of Agenor, who was said to have colonized this country (Herod. vii. 91). The inhabitants were formerly called Hypachæi (Ὑπαχαιοί), according to Herodotus (vii. 91). For our information on the geography of Cilicia we are chiefly indebted to Strabo (book xiv.), and Beaufort's survey of the line of coast as far east as the gulf of Issus (Scanderoon). With the interior we are very little acquainted; the principal towns which are known are on the coast. Level Cilicia is described as fertile: mountainous Cilicia has always been famous for a fine breed of horses; and the annual tribute of the Cilicians to Darius consisted of 360 white horses and 500 talents of silver (Herod. iii. 90).

The first town in mountainous Cilicia, on leaving Pamphylia, was Coracesium, according to Strabo (pp. 667, *d*, 670, *a*, Casaubon). The modern name is Alaya; it is a strong natural fortress, situated on a high and almost insulated rock. Coracesium held out against Antiochus (Livy, xxxiii. 20; Beaufort's *Karamania*, pp. 160—168).

The next town of importance is Selinus (Σελινουντ-ος), situate on a steep hill. The emperor Trajan died there, and the town was afterwards called Trajanopolis: the modern name is Selinty. Cape Anemurium (now Anamour) is the most southern point of Asia Minor; and probably from this circumstance (as Captain Beaufort suggests, p. 192) derived its name, which means 'windy point.' The small town and port of Celenderis (now Chelindreh) lies between Anemurium and Seleucia, the modern Selefkeh. The ruins of the antient Seleucia are many miles from the shore, on the west side of the river Calycadnus (Ghiuk Sooyoo), which now at any rate flows into the sea a few miles east of Cape Zephyrium (Beaufort, p. 226). This coast appears to be still as much infested by pirates as it was in the time of Strabo (pp. 671, *b*, 682, *a*). The shore presents a line of noble promontories and white marble cliffs rising perpendicularly from the sea. This rocky character diminishes a few miles west of Selefkeh, where the high lands begin to recede from the coast. Many rare kinds of animals and birds are found on the coast, and almost every district is said to have some peculiar to itself (Beaufort, p. 209). In the time of Cicero, Cilicia was famous for panthers.

There is no town of much importance between Selefkeh and the river Latmus (now Lamas), which was the boundary of mountainous Cilicia (Strabo, p. 671, *c*). Here the rocks and cliffs cease, and are succeeded by a gravelly beach and broad plains, which extend to the mountains. The principal towns in level Cilicia were Soli, Tarsus or Tarsi, and Issus or Issi (Xenoph. *Anab.*, i. 2, 23, 26). Soli was afterwards called Pompeiopolis, because Pompey settled the remains of the pirates there: the modern name is not ascertained; perhaps it is Menetlu (Captain Beaufort, p. 255). This town was the birth-place of Chrysippus, and of the poets Philemon and Aratus (Strabo, p. 671, *d*). Tarsus, antiently one of the most celebrated cities in Asia Minor, still bears a respectable rank: its modern name is Tersoos. Tarsus was the birth-place of the Apostle Paul, and a school for the study of philosophy and the arts. According to Strabo (p. 673, *d*), it was a superior school to Athens and Alexandria.

Tarsus stood in a plain on the banks of the Cydnus, now called the Tersoos river. The water of the Cydnus, as of the other rivers along this coast which carry down the melted snow from the ridges of Taurus, is extremely cold: injudicious bathing in it proved fatal to Frederick Barbarossa, and nearly so to Alexander the Great. The Cydnus has undergone a great change from the deposits carried down from the mountains: formerly it received large ships of war; now none but the smallest boats can enter it (Capt. Beaufort, p. 265). Issus is situated in the extreme eastern part of the plain of Cilicia, at the head of the Issic gulf, called the gulf of Scanderoon: here Alexander defeated Darius, B.C. 333. The river Pyramus (the modern Jyhoon), between Tarsus and the plain of Issus, has brought down such a quantity of sand and earth, that the river has been diverted twenty-three miles from its antient course (Captain Beaufort, p. 275): in Strabo's time the Pyramus entered the sea a little to the east of Cape Megarsus (Karadash); now the mouth is not much west of Ægææ (Ayas). Strabo (book xii., p. 536, *a*) says that it passes under ground for a great distance, and bursts forth again through a cleft of Mount Taurus: he was well aware of the immense deposits which were brought down by the stream.

The origin of the Cilicians is uncertain: they were probably a Phœnician colony (Herod. vii. 91). Their character in historical periods did not stand very high; and in this respect they were commonly classed with the Cappadocians. They were the only nation within the Halys, except the Lycians, whom Crœsus did not reduce (Herod. i. 28). Our earliest information represents them as governed by kings; and when Cilicia became one of the Persian satrapies, it evidently continued to be governed by native kings, subject of course to the Persian empire. The name of one of the Cilician kings, Syennesis, is familiar to the reader of Xenophon's 'Anabasis' (i. 2), and he was not the first of his name. Herodotus (i. 74) mentions one as contemporary with Alyattes; and Æschylus (*Pers.* 326, Dindorf) has immortalized the bravery of another, who joined Xerxes in his expedition against Greece.

Cilicia became a Macedonian province on the downfall of the Persian empire; Seleucus and his descendants, after the death of Alexander, held the sovereignty till Pompey reduced the level country to a Roman province. Cicero was proconsul of Cilicia A.U.C. 702; and for his success against those who had fortified themselves in the mountains, and had held out against his predecessor Appius Claudius Pulcher, he was rewarded on his return with a triumph. Till the reign of Vespasian, mountainous Cilicia appears to have been governed by kings who were appointed by the Romans, but after that time it became a province. (Strabo, xiv., pp. 668—676, Casaub.; and Beaufort's *Karamania.*)

CILI'FERA. [MICROZOARIA.]

CILIO'GRADA, an order of *Acalephans* instituted by De Blainville, and comprising the *Ctenophoræ* of Eschscholtz. The following is De Blainville's definition in his 'Actinologie,' where he admits that the distribution of the species of one of the genera (*Beröe*) adopted by him in the article 'Zoophytes' in the 'Dictionnaire des Sciences Natu-

relles,' according to the number of ambulacra, depended upon an erroneous observation, and consequently prefers that given by Eschscholtz, founded on the disposition of the *cilia*, at the same time considering Eschscholtz's genera *Pandora* and *Medea* in no other light than as simple divisions of the species.

Body gelatinous, very contractile, free, diversiform, evidently binary or bilateral, sometimes appearing subradiated, provided with a kind of straight ambulacra, formed by the approximation of two series of vibratory cilia.

Intestinal canal complete, or provided with two orifices, a mouth and a vent.

Before we proceed further, it will be necessary to inquire into the nature of the cilia above mentioned, with which, or, at least, with locomotive organs closely resembling them, many of the *Medusæ* are provided, though with certain modifications. Eschscholtz describes these cilia as pectinated or comb-like organs, arranged in longitudinal rows on the external surface of the body with their flat surfaces in contact. Each is made up of many small, flattened, pointed filaments, united by a common base, the points being directed towards the posterior extremity of the body. They are endowed with a motion not unlike the fins of fishes, and are slowly raised but suddenly struck back, whereby the body is carried through the water. In *Beröe* and its congeners the cilia are directed towards the closed extremity of the body, so that the opposite or open end is carried forward. The Ciliograde appears to have the power of enforcing a partial or total action of these organs at pleasure, so as to enjoy other motions besides that of direct progression. When separated from the body with a piece of the skin the cilia continue to move, as is observed in the article Beröe. Under each of the rows runs a longitudinal vessel, which communicates with the rest of the vascular system, and contains a fluid, in which there are yellowish particles. Eschscholtz looks upon these as arteries, and regards the cilia as respiratory organs in addition to their locomotive functions; Schweigger compares the vessels to the canals communicating with the tubular feet of *Echinus* and *Asterias;* and Dr. Grant inclines to think that the motion of the cilia, whose filaments he conjectures to be tubular, is due to their alternate fulness or emptiness of fluid derived from the longitudinal vessel, like the tubular feet of the *Echinodermata*. Whereupon Dr. Sharpey well remarks, 'This view of their mode of action, however, is scarcely reconcilable with the observed phenomena. Audouin believed that in the *Idya*, a genus nearly allied to the *Beröe*, the fluid of the longitudinal vessel, which he supposes to be water, is sent into the cilia; he therefore regarded them as respiratory organs. If the vessel under the cilia in this case, as in the *Beröe*, communicate with the rest of the vascular system, and its contained fluid be regarded as blood, then the cilia of the *Idya*, which, according to Audouin, are permeated by the fluid, would bear a certain analogy to the gills of fishes.' But our limits do not permit us to pursue this part of the subject farther, and we must therefore refer the student to the lately published and elaborate works of Professor Purkinje and Dr. Valentin, and of Dr. Sharpey.

De Blainville, who acknowledges that he has never studied the *Ciliograda* in a living state, and that he only knows them from figures and descriptions, or at best from some specimens preserved in spirits of wine, which he owes to MM. Quoy and Gaimard, says that, nevertheless, he has no doubt that they ought to be withdrawn from the class *Arachnodermaires*, wherein they have hitherto been placed by all zoologists. He observes that he cannot venture to assert whether they ought to pass to the type of the *Malacozoaria*, or whether they ought not to remain near the *Holothuriæ*, and adds that it is a subject of research which can only be terminated by investigation in the living subject

De Blainville goes farther:—'A sufficiently great number of persons,' he remarks, 'have spoken of the *Ciliograda*, but voyagers have been nearly salways the persons who have observed them—in a living state, it is true—but incompletely. I do not know even one zoologist who has published "quelque chose d'un peu rationnel" upon their organization. What we know is limited to some details as to their mode of locomotion. Thus, we learn from those who have seen them in the sea, that the *Ciliograda* are gelatinous transparent animals, continually agitating the cilia with which their very contractile body is provided, organs which possess the phosphorescent faculty in the highest degree. They float thus continually free, and swimming in the waters of the sea at sufficiently great distances from the banks. For the rest, we are ignorant of the nature of their food, of the mode of their generation, and other circumstances of their manners and habits.' The work wherein this passage appears was published in 1834, and though we by no means would have it understood that there is not still a great deal to be done before the whole of the organization of the *Ciliograda* can be satisfactorily elucidated, we cannot agree with M. de Blainville's assertion of the entire state of ignorance which, he would have us believe, prevails on the subject. In addition to the interesting labours of other observers, some of whom we have already mentioned, Fabricius had detected minute crustaceans in the digestive organs of *Beröe*, and thus furnished a key to the nature of the nourishment of that genus; and an abstract of Dr. Grant's paper 'On the Nervous System of *Beröe Pileus*' was published in the 'Proceedings of the Zoological Society of London' early in 1833.

Geographical Distribution.—M. de Blainville says that *Ciliograda* exist in all the seas; but that it seems to him that they are most abundant in those of the north, perhaps, he adds, because they have been neglected.

Systematic Arrangement.

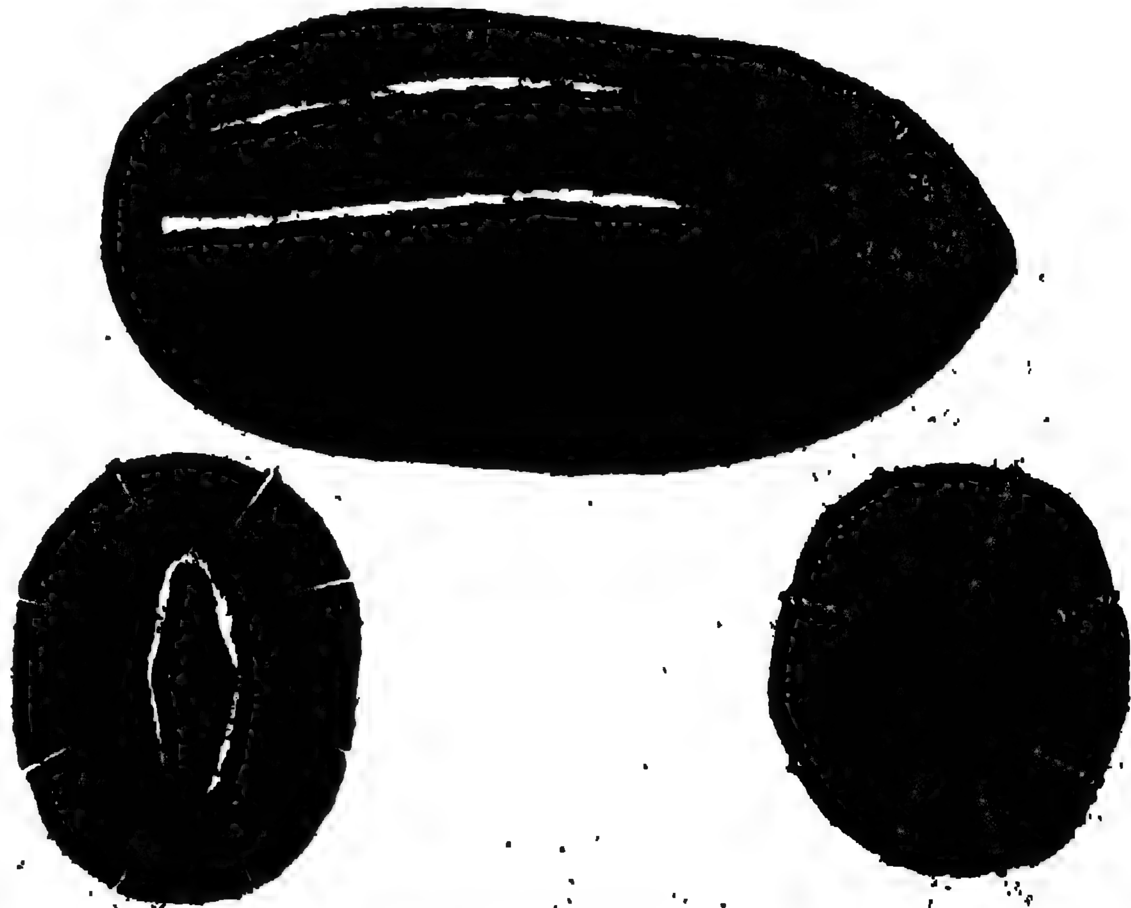
De Blainville, whose amended arrangement we take, observes that systematists have hitherto agreed to imitate Gmelin more or less on the subject of the place of the *Ciliograda* in the animal series, that is to say, in making them a genus approximating to the *Medusæ;* and he instances Lamarck, Cuvier, Latreille, and Oken, as not having expressed any doubts on the subject.

Genera. Beröe.

a.

Species whose cilia are smaller than the interstices which separate them (Genus Beröe of Eschscholtz).

Example, *Beröe ovata*. Those found by Browne seldom exceeded three inches and a half in length, or two and a half in the largest transverse diameter. 'This beautiful creature,' says Browne, *Jamaica*, p. 384, 'is of an oval form, obtusely octangular, hollow, open at the larger extremity, transparent, and of a firm gelatinous consistence; it contracts and widens with great facility, but is always open and expanded when it swims or moves. The longitudinal radii are strongest at the crown or smaller extremity, where they rise from a very beautiful oblong star, and diminish gradually from thence to the margin: but each of them is furnished with a single series of short, delicate, slender appendixes or limbs [the cilia] that move with great celerity either the one way or the other, as the creature pleases to direct its flexions, and in a regular accelerated succession from the top to the margin. It is impossible to express the liveliness of the motions of those delicate organs, or the beautiful variety of colours that rise from them while they play to and fro in the rays of the sun; nor is it more easy to express the speed and regularity with which the motions succeed each other from the one end of the rays to the other.' Dr. Browne frequently met with these animals to the north of the western islands (West Indies).



[Beröe ovata.]

β.

Species whose cilia are twice as long as the interstices. (Genus *Medea*, Eschscholtz.)

Example. *Beröe rufescens*

γ.

Species whose cilia are situated in two ambulacral ridges. (Genus *Pandora*, Eschscholtz.)

Example. *Beröe Flemingii*.

Cydippe.

Body regular, free, gelatinous, divided into eight sections, more or less distinct, by as many double longitudinal rows of vibratory cilia. An internal cavity, with a large buccal (?) aperture, whence issue, and are prolonged more or less below, a pair of long appendages, which are retractile, and also furnished with vibratory cilia.

Example. *Cydippe pileus*, *Medusa pileus*, Gmelin; *Beröe pileus*, Lamarck; *Pleurobrachia*, Fleming; *Eucharis*, Péron, who really established the genus; but Eschscholtz having transferred the last name to a genus of Ciliobranchians, De Blainville prefers following him, to avoid greater confusion. [BEROË, vol. iv., p. 317.]

Callianira.

See the article, vol. vi., p. 163.

Mnemia.

Body smooth, oval, elongated vertically, very much compressed on one side, and as if lobated on the other. Buccal opening between the prolongation of the sides: conical appendages on which the rows of vibratory cilia are ranged.

Example. *Mnemia heteroptera*, *Callianyra heteroptera* of Chamisso, thus described by MM. de Chamisso and Eisenhardt:—Body hyaline, cylindrico-tubular, dilated at one extremity, with a transverse mouth, into which it was impossible to penetrate. A large cestoid wing on each side, with vibratory cilia on its edges; six intermediate smaller wings, of which the four inferior (buccal) are lanceolated, ciliated on the edges, and attached to the base of the body; two superior cestoid wings uniting themselves to the two large lateral ones, which Péron, according to the describers, erroneously regarded as branchiæ. It is suggested that the two pairs of appendages of the mouth may be the analogues of the buccal appendages of the Lamellibranchiate Malacozoairians; — the two double bands on each side their branchiæ;—and then the question arises whether the Ciliograda might not be placed under this type and form, a particular class, but little removed from the *Biphores* [SALPACEA], and forming a passage still more marked towards the Actinozoairians. The cilia, which have some analogy with those on the edge of the mantle of the Lamellibranchians, are said to be only coloured by the decomposition of light between their borders.

Calymma.

See the article, vol. vi., p. 173.

Axiotima.

Body a little elevated, a little compressed, or subcircular, prolonged to the right and left into a sort of appendages, bearing the series of cilia towards their terminal half only, and up to their end. Mouth small, entirely deprived of labial appendages.

Example. *Axiotima Gaïdis*, Eschscholtz. Locality, South Seas, near the equator.

Eucharis (Eschscholtz).

Body oval, sufficiently elevated, slightly compressed, or subcircular, covered with papillæ, with the ambulacra of natatory cilia extended from the summit to the base. Mouth small, provided with two rather long pairs of appendages.

Example. *Eucharis Tiedmanni*, Eschscholtz. Locality, seas of Japan. This name had been employed, as we have seen, by Péron, to distinguish another genus of Ciliograda, and should not have been transferred: for in all such cases confusion must be the consequence. The student must now remember that the *Eucharis* of Péron and that of Eschscholtz represent two different generic forms.

Ocyröe.

Body gelatinous, transparent, vertical, cylindrical, provided above with two lateral musculo-membranous, bifid, thick, wide lobes, and with two fleshy ciliated rib-like elevations, with two other ciliated ribs upon the edges between the lobes: aperture provided with four ciliated arms.

Example. *Ocyröe crystallina*, Rang, who founded the genus. De Blainville thinks that it bears much resemblance to the last species of *Callianira*—*Callianira hexagona*?

Alcynöe.

Body gelatinous, transparent, vertical, cylindrical, with eight ciliated ribs, hidden in part under the vertical natatory lobes. Aperture provided with four ciliated appendages.

Example. *Alcynöe vermiculata*, Rang, who established the genus. Locality, coasts of Brazil.

Cestum.

Body gelatinous, free, regular, very short, but extended or prolonged on each side into a long riband-like appendage, bordered on each angle with a series of vibratory cilia, thus forming four ambulacra, two on each side. Mouth inferior and mesial, accompanied by a pair of long, ciliferous, retractile and simple appendages.

Example. *Cestum Veneris*, Lesueur.

Upon this singular genus De Blainville remarks, that it was established by Lesueur from an animal living in the Mediterranean Sea, and that he only knows it from the figure and description given by the author, unfortunately from an individual the extremities of whose lateral prolongations were truncated, and which nevertheless was a metre and a half wide. It is, adds De Blainville, evidently a very singular animal, but which may be doubtless considered as a very short Beröe with eight rows of cilia, pinched and drawn out as it were into an enormous riband of little thickness, and bearing upon each angle its ambulacra of cilia. In fact, it would appear, he continues, that the intestinal cavity, which is very short on account of the brevity of the body, is plunged laterally into the appendages; so that it must be believed that the opposite aperture escaped the notice of M. Lesueur, and that it is exactly opposed to the mouth, as in the true Beröes. He further states, that M. Martens had observed a complete individual though of small size, and that M. Martens was positively sure that it is nothing but a true Beröe. This, M. de Blainville says, M. Martens told him when at Paris with the officers of the Russian expedition round the world; and he adds, that, unfortunately, the premature death of that naturalist has left room for fearing that we may be long without the reasons on which he grounded his views. Cuvier, who places the genus among the simple Acalephans, describes the lower band of cilia as being smaller and less numerous, and the mouth as being in the middle of that border, and forming a large aperture which opens into a stomach pierced across the breadth of the riband, and leads to a very small vent. Two vessels, he adds, are given off from the extremity, near the vent, which run round the extremities of the riband. Two sacs open at the sides of the mouth: these are probably the ovaries. Cuvier concludes by comparing the animal to a Callianira with two sides, and whose wings are excessively prolonged; and he gives the length, or rather the breadth, at more than five feet, and the height at two inches. He further observes, that it is rarely found entire; and that the *Lemnisque* of Quoy and Gaimard (Freycinet's Voyage) is probably a fragment of Cestum. Lamarck places it, together with Callianira and Beröe, among the *Anomalous Radiaria*.



[Cestum Veneris.]

CIMABUE, GIOVANNI, was born at Florence, in the year 1240, of a noble family. During his youth he was sent by his father to study letters at the convent of Santa Maria Novella. When some Greek artists came to ornament the convent church with paintings, he abandoned studies to which he was little inclined, and devoted his attention to

watching them; and he was ultimately permitted to assist them. Having acquired more knowledge than his instructors possessed, he became noted as one of the best painters of the day, and executed many works for religious persons and communities. His fame having spread abroad, he was invited to adorn the church of St. Francis at Assisi. He painted part of the walls in concert with certain Greek painters; but having far surpassed his assistants, his courage and ambition increased, and he went on with the work alone. He was recalled to Florence by private affairs, and obliged to leave his work uncompleted. It was afterwards finished by Giotto. After his return to Florence, among other pictures he painted a Madonna for the church of Santa Maria Novella, which was of a size so unusual at that time, and was considered so novel and splendid, that it was carried to the church in procession; and according to the tradition, when Charles of Anjou visited the church, multitudes who had not yet obtained a sight of the picture accompanied him with such rejoicing and festivity, that the street was afterwards called Borgo Allegri — literally, 'Merry Borough. Cimabue was engaged as an architect, in conjunction with Arnolfo Lapi, to build the church of Santa Maria del Fiore; but he died shortly after, in the year 1300.

Previously to the time of Cimabue, painting had sunk to a merely mechanical occupation, and was chiefly in the hands of Greeks, who worked after certain fixed patterns, each blindly copying his predecessor. Cimabue's right to be considered as the restorer of the art has been warmly urged, and as warmly contested. It appears probable that a reaction had taken place, and that contemporary or even preceding artists had shown an inclination to abandon the mechanical dryness of the modern Greek artificers, when Cimabue took up the profession. The ardour of his disposition however, and perhaps his rank in society, induced him to venture upon the most notable deviations from the cramped style of the period; and the revival of the art would probably have been delayed some time longer, had it not been for the impulse which it received through him. He put some life into the heads and into the action of his figures, abandoning the cold straight lines of his Greek instructors. He is supposed to have been the first to recur, after a long interval, to the study of nature, and to have drawn from the living model, though but sparingly. Nor is it the least debt which painting owes to Cimabue, that he discovered and fostered the genius of Giotto.

He worked in fresco and distemper, oil painting being a later discovery. Some of his works still exist; the principal are in the church of Santa Maria Novella at Florence, and that of St. Francis at Assisi. (Vasari; Lanzi.)

CIMARO'SA, DOMENI'CO, one of the most celebrated composers of the Italian theatre, was born at Naples in 1754. To Aprile he was indebted for his first instructions in music, but he completed his studies under Durante, at the Conservatorio of Loretto. His general education was also of a superior kind, and he was not only esteemed for his professional ability, but for his well-informed mind and amiable temper. The first work that made him known was 'L'Italiana in Londra,' performed in 1779. But it is 'Il Matrimonio Segreto' which will transmit his name to posterity; for it must be acknowledged, that of his thirty operas, most of which were in their day the admiration of all amateurs, the last mentioned is the only one now ever performed, or likely to be again heard. When this was brought out at Vienna, it so delighted the emperor, Joseph II., that at its conclusion he invited the singers and band to a supper, then sent them back to the theatre, and the whole piece was repeated; the only instance on record of the *encore* of an entire opera. In 1787 Cimarosa was invited by the Empress Catherine to St. Petersburg, where he produced three operas. He returned to Naples, and having shown no little partiality for the French during their occupation of that city, very narrowly escaped the sanguinary proscription which disgraced the restoration of the old royal family. He died at Venice in 1801.

Cimarosa excelled most in comic opera, but his 'Orazi e Curiazi' proves that he could compose well in a different style. He is the link which unites the old and modern schools, his scores exhibiting an instrumentation much stronger than that of Paisiello, though inferior in vigour and richness to that of Mozart. The latter was, by many composers of his day, censured for the fulness of his accompaniments. Grétry, when asked by Napoleon the difference between Cimarosa and Mozart, replied, 'Cimarosa, Sire, placed the statue on the stage and the pedestal in the orchestra, but Mozart put the statue in the orchestra and the pedestal on the stage.'

CIMBEX, a genus of Hymenopterous insects of the section *Terebrantia*, sub-section *Securifera*, and family *Tenthredinidæ*.

The genus Cimbex, as it formerly stood, has been subdivided (principally by Dr. Leach) into the following subgenera: *Cimbex, Perga, Syzygonia, Trichiosoma, Clavellaria, Zarea, Abia*, and *Amasis*. All these subgenera have the antennæ short, and terminated by thickened joints, which are nearly of an oval form; the third joint of the antennæ is long, forming a knob: the superior wings have two marginal and three sub-marginal cells.

The antennæ of these insects generally present six distinct joints, of which the two basal joints are very short, and almost concealed by the hair on the head; the third is long, the fourth and fifth are of moderate length, and the sixth is elongate (or moderate), rounded at the apex, and tapers more or less towards the base; this last joint is, however, evidently composed of two or three joints consolidated. All the joints of the tarsi have a membranous pad attached to their under side, and protruding from their apex.

The genus Cimbex, as now restricted, may be known by the following characters: body slightly hairy; abdomen with the basal segment emarginate above (that is, it appears as if a semicircular piece had been removed); the space thus left unprotected by the horny covering filled up with a membrane.* Thighs of the four posterior legs of the males very thick, those of the females moderate. Tarsi of the males with a tooth-like projection on the under side of the basal segment.

This genus includes the largest species of the family Tenthredinidæ.

Cimbex Griffinii is about an inch in length, and when the wings are expanded its width is about one inch and three quarters. It is of a reddish-brown colour; the abdomen is yellow, and more or less clouded with brown towards the base; the antennæ and tarsi are yellow, the former is brighter towards the apex.

The larva, we have been informed, feeds upon the sallow, and is not uncommon in the neighbourhood of Cambridge. Mr. Stephens enumerates eight British species of this genus, some of which, however, it is thought, will eventually prove to be mere varieties.

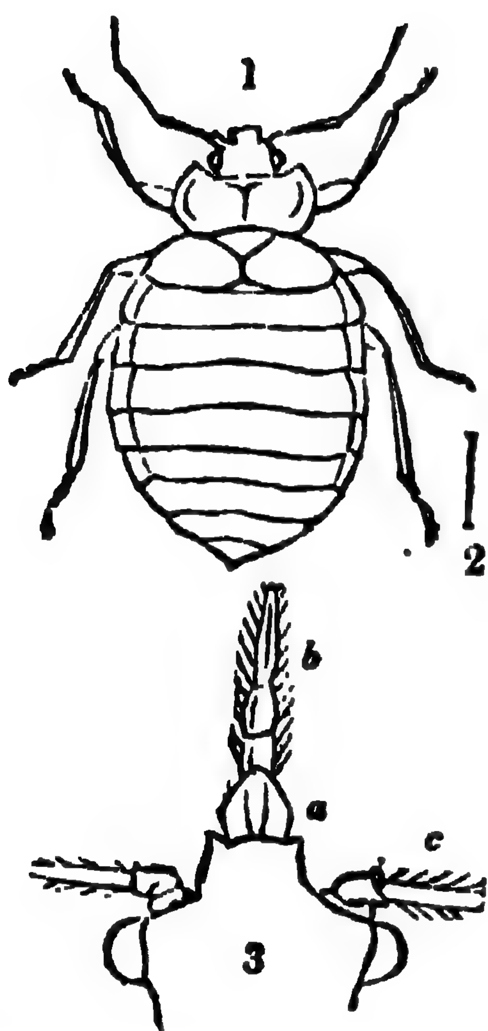
CIMBRI, or KIMBRI, the name given by the Roman and Greek historians to a vast multitude of people who came from the northern parts of Germany at the same time as the Teutones, crossed the Rhine, and entered Gaul, where they joined the Ambrones, a Celtic tribe, and, after ravaging and plundering part of Gaul, went into Spain, where they were repulsed by the Celtiberi. (Livy, *Epitome* lxvii.) The Teutones and Ambrones then made an irruption into Italy, where they were defeated by Marius, 102 B.C. Part of the Cimbri, however, had gone into Helvetia, where they were joined by the Tigurini, an Helvetian tribe, with whom they crossed the Pennine Alps, and, after defeating the pro-consul Catulus, entered the plains of Lombardy, where they were defeated by Marius in the year after the Teutones and the Ambrones, 101 B.C. From that time little or no mention is made of the Cimbri in history, but tradition says that the remnant of them settled in the central valleys of Helvetia, and the inhabitants of the Waldstätten and of the Bernese Oberland are supposed to be their descendants. Old Scandinavian words are traced in the dialect of these mountaineers. Of the original residence of the Cimbri we know nothing certain. Strabo (vii. 291—4) places them north of the Elbe beyond the Chauci, and numbers them among the German tribes. Pomponius Mela (iii. 3) places the Cimbri and Teutones in the islands of the Baltic Sea. Pliny speaks of the promontory of the Cimbri; and the peninsula of Jutland has been called Chersonesus Cimbrica, without however it being proved that the Cimbri ever inhabited it. It is probable that the Cimbri who invaded Italy were composed of mixed tribes, both Teutonic and Celtic, for in their war with Marius, the description of their arms, and the name of their chief Bojorix, appear to designate them as Celtæ. (Mannert, *Geographie der Griechen und Römer.*)

CIMEX. [CIMICIDÆ.]

* This structure is very remarkable, and is evidently to allow of a free movement of the abdomen in an upward direction.

CIMI'CIDÆ, a family of Hemipterous insects, the species of which may be distinguished by their having the rostrum short, and consisting of two or three joints only; the labrum also short, and without striæ; the eyes are moderate; the body is generally very much depressed. The principal genera are *Cimex*, *Aneurus*, *Aradus*, *Agramma*, *Tingis*, and *Dictyonota*, all of which are found in England. The genus *Cimex* is distinguished principally by the extreme slenderness of the two terminal joints of the antennæ, which are not thicker than a hair. The body is very much depressed: the thorax is transverse; antennæ four-jointed; basal joint very short, second long, the third of about equal length, the fourth rather shorter. Labrum rather long, somewhat pointed, and, when the proboscis is not in use, recurved under the head; proboscis three-jointed, and, when at rest, lies along the under side of the thorax, its apex being between the two fore-legs at their base.

There are said to be two or three species of this genus. We have however never had an opportunity of examining any but the common bug (*Cimex lectularius*), of which an account is given under the head BUG. We have here added an outline-drawing to show its structure; for although it is *too* common an insect, it is seldom examined except by the entomologist.



1, common bug (*Cimex lectularius*) magnified; 2, natural length of do.; 3, head of do. highly magnified; *a*, the labrum; *b*, the proboscis; *c*, base of the antennæ.

CIMOLITE, a hydrous silicate of alumina found in the island of Cimola. It occurs in amorphous earthy masses, the structure of which is rather slaty. Colour greyish-white. Fracture earthy, uneven. It is soft and opaque, and its specific gravity is 2·0.

It is used for the same purposes as fullers' earth.

CIMON (Κίμων), the name of two Athenians, one the father (Herod. vi. 34) and the other the son of Miltiades. The memory of the elder Cimon rests almost entirely on the fame of his son; scarcely any thing is known of him except that he was remarkably stupid. Cimon, the son of Miltiades and Hegesipyle, was born about 502 B.C. Miltiades died in prison, and Cimon had to pay the fine which had been imposed on his father. Without the aid of the opulent Callias, who is said to have assisted him, fifty talents would probably have made a large and inconvenient inroad on his patrimony (Herod. vi. 136). The anecdotes which remain of Cimon's early youth are not creditable either to his morals or to his intellect. The worst excesses are laid to his charge. Although little confidence can be given to the details of these numerous reports, so much seems to be clear, that he did not do as others of his rank did, or as it was expected that the son of Miltiades would do. He even neglected what in Athens were usually deemed the essential branches of a liberal education. On the other hand, the stupidity which is ascribed to him at this period, and the reputation for which fixed on him his grandfather's nickname Coalemus (ὁ κοάλεμος, 'the idiot'), was probably nothing more than a natural reserve, combined with a certain inaptitude to social vivacity or oratorical display, which however may not have at all disqualified him for the services of active life. He seems to have excelled rather in doing, than in talking about doing. Aristides almost alone discerned in him the elements of a great character; and it is probably to his fostering charge and counsels that the glorious results which were afterwards developed are partly due.

Cimon's entrance into public life may be placed at the conquest of Eion, on the Strymon, B.C. 476. This town, which was very important to the Persians, was desperately defended by the garrison under the command of Boges, who at last, rather than surrender, raised a huge pile, placed on it his wife and children, and servants, and all his treasures, and after thowing his gold and silver into the Strymon, cast himself into the flames. (Herod. vii. 107; Thucyd. i. 98.) Cimon's next victory was at the island of Scyros, which he seized under the pretence that it had been guilty of piracy which called for punishment. He planted a colony of Athenians, and divided the land amongst them. (Thucyd. i. 98.) But Cimon's most important victory was at the Eurymedon in Pamphylia, B.C. 466, where he sunk or took 200 Persian ships, and carried away prodigious booty from their tents on the banks of the river. A squadron of Phœnician ships which was coming to the aid of the Persians was met by Cimon, and wholly destroyed. The Persians were still in possession of the coast of Thrace. That Cimon should feel peculiar interest in wresting those possessions from their power is easy to be explained: Olorus, the father of Hegesipyle, had been king of Thrace. (Herod. vi. 39.) Accordingly he sailed with a small force and dislodged them from his patrimony, and from a large extent of adjoining country. Twice he led a force to assist the Lacedæmonians, B.C. 464 and 461, at the siege of Ithome. The insulting manner in which the services of the Athenians were rejected by the Lacedæmonians (Thucyd. i. 101, 2) on the latter occasion, seems to have put the people in ill humour with all the friends of Sparta; and this may have had some effect in bringing about Cimon's exile. Towards the end of the same year (B.C. 461) in which they returned from Ithome, Cimon was banished for ten years by ostracism. (Clinton, *Fast. Hel.*, vol. i., p. 48.) In the year B.C. 457 there was a battle between the Lacedæmonians and Athenians, at Tanagra in Bœotia. Cimon presented himself to fight on the side of the Athenians, and took his stand among those of his own tribe. The council of 500 were consulted, and he was not allowed to remain: he left the army beseeching his friends to act like brave men, and to prove their attachment to their country by their deeds. The Athenians however were signally worsted; and this, with other defeats which they suffered during the exile of Cimon, seems to have led them to wish for his return. In the fifth year of his banishment he was recalled by a decree, of which Pericles himself was the mover. A five years' truce between the Athenians and Lacedæmonians was concluded through the intervention of Cimon B.C. 450. In the following year, 449, he was appointed to the command of a fleet of 200 vessels, which sailed to assist the Egyptian king Amyrtæus. He sent on a squadron of sixty galleys to the aid of Amyrtæus, and with the rest besieged Citium in Cyprus. Here he died, either from illness or from a wound. Just before he died he forbade his men to report his death until they arrived at Athens; and Plutarch preserves the remark of Phanodemus, that the army was as it were conducted by Cimon thirty days after he was dead. Though the Athenians were forced by want of provisions to raise the siege of Citium, they did not return home without a victory: they met with a fleet of Phœnician and Cilician ships near Salamis in Cyprus, and completely defeated them. They afterwards defeated a force on shore.

The slender private fortune to which Cimon succeeded had been considerably augmented by his Persian victories, and especially by the recovery of his patrimonial estates in Thrace. He did not use his acquisitions for personal aggrandizement: his munificence was not only fully equal to his means, but was in many respects judiciously dispensed: he preferred hospitality to luxury, and would rather provide a frugal entertainment for many, than a sumptuous banquet for a few. Many of the splendid improvements which he made in Athens were effected at his own cost. The walls from the city to the harbours of Piræus and Phalerum were commenced, and in great part executed at Cimon's expense. He changed the Academy from a barren uncultivated field to a shady and pleasant grove, and planted the Agora with plane trees. It is probable that his taste in these

public decorations was improved by his acquaintance with the painter Polygnotus.

The great object of the policy of Cimon was unceasing war with the Persians, and, in order to prosecute this the more effectually, he strove to maintain the unity of the Greeks. Himself of noble birth, he naturally belonged to the aristocratical party, and was anxious to preserve the old institutions of his country, which time and usage had rendered sacred. He desired to see Sparta independent, an ally, or even a rival, rather than a subject of Athens; and this circumstance exposed him to many odious charges, which, however groundless and often refuted, probably exerted an influence on the estimation in which he was held. While Cimon was engaged in continual expeditions, and was nearly five years in exile, a line of politics, altogether different from his, came into vogue under the auspices of Pericles [PERICLES], who must be considered as Cimon's successor on the political stage. (Plutarch, Nepos, *Life of Cimon;* Thirlwall's *Greece*, vol. iii., pp. 1—36; Heeren's *Pol. Hist. of Greece*, p. 223, *Eng. transl.*)

CI'NCHONA, a genus of monopetalous exogens, the different species of which have a great reputation in medicine. It constitutes the type of a natural order of the same name, and is distinguished by the following characters. Tube of the calyx top-shaped, with a permanent five-cleft limb. Corolla with a taper tube, and a five-parted limb, which is valvate in æstivation. Filaments short, inserted into the middle of the tube; within which the linear anthers are altogether enclosed. Stigma two-cleft, a little clavate. Capsule ovate or oblong, slightly marked on each side by a furrow, two-celled, crowned by the calyx, dividing through its dissepiments into two halves. Placenta long. Seeds numerous, erect, imbricated upwards, compressed, with a broad membranous winged border; albumen fleshy. Trees or shrubs with a bitter aromatic astringent bark. Leaves on short stalks, with flat edges. Stipules ovate or oblong, leafy, separate, deciduous. Flowers in terminal panicled corymbs, white, or of a rosy-purple colour.

By whom the important properties of the various species of this genus were first made known to Europeans is unrecorded; for it is not worth repeating the fables that have been invented upon the subject. The native Peruvians, who call the trees Kina, or Kinken, attach no febrifugal importance to the bark, but are said even to have a prejudice against its employment. Its introduction to Europe took place through the Spaniards in the year 1640, and it is pretended that a certain countess Chinchon, vice-queen of Peru, having experienced the good effects of the bark as a febrifuge, it gained the name of Pulvis Comitissæ, and under that name, or as Pulvis Jesuiticus, was vended by the Jesuits, who derived a considerable part of their wealth from its trade. Humboldt regards a tradition still current in Loxa as a more probable explanation of the discovery of the properties of Cinchona. It is said that the Jesuit missionaries there had endeavoured, according to the custom of the country, to distinguish the different kinds of trees by chewing their bark, and that this had led them to observe the remarkable bitterness of Cinchona. Those who were medical among them were thus led to try an infusion of the bark in tertian agues, which are very common at Loxa, and thus the discovery of its power was made. Little was known of the tree producing this substance till the voyage of La Condamine, who, in 1738, first printed a detailed account of Quinquina, as it was then called. Since that time the attention of botanists has been constantly directed to the subject, and a good deal of information has, upon the whole, been collected; the general facts connected with the habitation, geographical range, modes of preparation, and botanical distinctions of the species, have been ably stated by Humboldt, Ruiz and Pavon, Fée, De Candolle, Lambert, and Pöppig, and will form the basis of the succeeding short account; but in all the minor details regarding the barks themselves, and the species that furnish them, Europeans are still much in the dark.

To this genus botanists have from time to time referred plants which upon a more careful examination have been ascertained not to belong to it; West Indian, Brazilian, and even East Indian Cinchonas, thus have found a place in books, but they are really referable to other genera. Circumscribed within the limits of the preceding character, Cinchona will be found a mountainous genus confined to the Cordilleras, between La Paz, in about 22° S. lat., and Santa Martha, near 10° N. lat.; a line having these northern and southern limits, and bounded by the most eastern part of the Cordilleras on the one hand, and the Pacific on the other, will very nearly define the corner of the globe inhabited by true Cinchonas. Within these limits they occur on the plains, but chiefly on mountain sides as far as 10,000 feet of elevation above the sea, the principal zone being at from 1800 to 6600 feet of elevation. In these places the mean temperature is estimated by Humboldt at from 17° centigrade, or 62·6° Fahrenheit, to 12° centigrade, or 53·6° Fahrenheit.

The manner of collecting the Huanuco bark of commerce is thus described by Pöppig (*Companion to the Botanical Magazine*, vol. i. p. 249). 'In the month of April the preparations for an expedition commence; and in May the people start for the forest, whence the last green bales are transmitted home in November. They fell the trees close to the root, sparing those trunks which appear too young (*palos verdes*), as, till they have attained maturity, the bark is of no value. The next process is to divide (trozar) the stems into pieces of uniform length, rejecting only the very smallest branches. With a peculiar kind of knife, made for the purpose, the bark is cut lengthwise, and a certain degree of practice is necessary to perform this operation properly, so as to remove the rind without injuring the wood or severing any of the fibres. With the same instrument they take off the stripes (longos) of the bark as broad as possible; but this, however, is not done for three or four days after the tree is felled, as before that time the moisture that exists between the cuticle and the wood would prevent the bark from severing into such large pieces as fetch the highest price. A worse consequence ensues from stripping the stems too quickly, as then the thin grey or blackish epidermis shivers off; and from the presence of this outward rind, covered with many cryptogamæ, the value of the bark, in the European market, is mainly estimated. The English purchasers in particular hold the notion that the bark is most powerful according as its epidermis is covered with spots.

'On the celerity with which the article is dried depends the price which it commands; but there are few instances where prejudice is so powerful as in the trade of the Cinchonas. In the dense forests it is impossible to perform this operation properly, and therefore the bundles of green bark are despatched with all speed to the nearest inhabited place, where the person appointed to take the charge of them is stationed. Without any preparation they are laid in a spot exposed to the full action of the sun, the greatest care being requisite to protect them from wet, as even a few hours' dew falling on the half-dried bark will give to the cinnamon-brown interior of the finest sort a blackish appearance, and lessen its value about one-half. The quickness of the drying, and the general excellence of the article, are indicated by the pieces being rolled up into several spiral windings, which form so solid a cylinder as to exhibit no cavity (canuto) within; but such portions are rarely seen unfractured in Europe. The Cinchona barks are no less sensible of atmospheric moisture than the Coca, which I formerly described, so that the collectors always hasten to send them to the dry climate of the Andes, or the principal towns. An unavoidable loss, however, hence accrues: however perfectly the bark may have been dried in the woody region, it still loses, in three or four days after its arrival in Huanuco, twelve to fifteen per cent. on its weight. The packages are made up into bales of four or five arrobas each, and with the greatest possible care, in order that the beautiful canes of two feet long, into which the bark was coiled on the Montaña, may not be broken in the carriage. Trailing plants (bejucos) are used to tie up the bundles, and when they arrive in Lima they are undone, and sorted into lengths of different pieces, previously to despatching them in chests to Europe. The trade in Huanuco bark was very brisk twenty years ago at Lima, and the article went to the Spanish market under the name of *Cascarilla roxa*, without being confounded with the *Cortex Chinæ ruber*, as it is called by us. The barks from the districts of the Lower Huallaga, of Huambo and Chachapoyas, &c., are, on the other hand, very little prized in Cadiz, and called *Cascarilla arollada*.'

Books and memoirs without end have been written to determine the different species of Cinchona that yield the barks of commerce, but with very little result. There are difficulties in the way of this which persons unacquainted with the bark trade can hardly estimate. For example,

the bark of the same species may be weak and valueless in warm lowland districts, and of the greatest price in alpine or mountainous regions. The bark of the low country about S. Jaen de Bracamorros has uniformly proved worthless, although the same species which grow there afford a fair bark at Mayobamba, Chacapryas and Lamas in the mountains; and others which at Maynas are perfectly inert, are energetic enough upon the sides of the mountains. It is related by Pöppig, that in ignorance of this, many speculating merchants have been ruined by the purchase of the bad lowland bark of Peru. The rule is, that the best bark always comes from mountain tops, from single trees growing in the coldest and most elevated spots. Some of the finest kinds are procured near the mountain villages of Cayambe and Pillao, and from the mountains of Panataguas and Pampayaco.

To pretend to reduce to their botanical species, in the existing state of knowledge of Cinchona barks, all the varieties that are known in shops or in commerce, would be a vain and hopeless task. Nothing can well be more startling than the discrepancies that exist upon the subject in books and collections; every collector, every writer, has his own set of specimens and opinions, and there is no possibility of reconciling them. There is not a chest of bark which, although called of one sort, has not probably been furnished by many different species; and there is much reason to believe that many of the best known sorts of barks of the shops are in reality furnished by the same species under different circumstances. Fée asserts that grey quinquina passes into yellow by shades that cannot be distinguished; that yellow approaches the red both in colour and flavour; and that nobody knows to this day with any certainty the origin of even the barks of Loxa, Lima, Huanuco, or Carthagena. Pöppig, who has so long lived in the Cinchona countries, seems to be of the same opinion, notwithstanding the details he has given respecting certain species—details of which we have availed ourselves in the following observations. In particular, with reference to this subject, to which a vast deal more importance is attached than it deserves, when speaking of the Huanuco bark of commerce, Pöppig's remarks are highly deserving of attention. He observes, that as to the various species of trees that produce bark, and the different quality of the article itself, much prejudice exists. Without cause one species is rejected, and another prized for its imaginary qualities; and the same species is unmeaningly divided by the bark-collectors into several, upon no known or intelligible principle. *Cinchona glandulifera* has three names, although scarcely the least trace even of varieties can be detected upon the closest botanical examination.

It is doubtful whether the species of any genus of plants are more variable in their appearance than those of Cinchona; and hence those who have been acquainted with them from dried specimens only, or who have not been aware of their tendency to vary, have multiplied the species far beyond their true number, and an inextricable confusion would have been the result in any genus less constantly before the eyes of the botanist. Thus the authors of the 'Flora Peruviana' in that work added thirteen supposed new species, and introduced many more into their Herbarium; Mutis, on the other hand, who had ample means of studying Cinchonas in New Grenada, declares that he was acquainted with seven only. Zea asserts that all the efficacious species of the 'Flora Peruviana' are reducible to four. Fée admits eighteen certain species; and De Candolle reduces the number to fifteen, although he introduces two species unknown to Fée. Humboldt states that he has himself seen *C. pubescens*, the yellow bark, with ovate-oblong, ovate-lanceolate, and ovate-cordate leaves on the same plant; he adds, that some species, such as *C. macrocarpa*, have either leaves entirely smooth or downy on each side, and that even *C. condaminea* has extremely different leaves, according to the elevation at which it grows. These statements alone are sufficient to show how much caution is required in distinguishing species in this genus; but to this it is necessary to add, that there is too much reason to suspect that the authors of the 'Flora Peruviana,' in creating spurious species, were influenced by a wish to please the Spanish court, by appearing to prove that the barks of Peru, from which the Spaniards exclusively derived so large a revenue, were altogether different from those of New Grenada, which other nations could easily procure direct from Carthagena. Humboldt adds, that mercantile cunning with reference to this subject was carried so far, that at the royal command a quantity of the best orange-coloured Cinchona bark from New Grenada, which Mutis had caused to be picked at the expense of the king, was burned, as a decidedly inefficacious remedy, at a time when all the Spanish field hospitals were in the greatest want of this indispensable product of South America. It should however be observed, that some of Ruiz and Pavon's species have been restored by a recent writer upon the authority of dried specimens; but it appears to us safer in such a case as this, to take the opinion of a man like Humboldt, who studied Cinchonas in their native forests, than that of a botanist who can be acquainted with them only from Herbaria.

In the following enumeration of the species, we take De Candolle as our guide in the systematic distinctions of the species, and Humboldt and Pöppig principally for the practical observations upon them. After every specific name, we have added the synonymous names that occur in books, for the information of those of our readers who may possess Materia Medica works whose nomenclature is different from that of De Candolle.

* *Corollas downy on the outside or silky.*

1. *C. Condaminea.* Leaves oblong, tapering to each end, smooth and shining, pitted on the under surface at the axils of the veins. Limb of the corolla woolly. Capsules ovate, twice as long as broad. (*Syn.* C. officinalis, L.) Humboldt states this to be the fine Uritucinga bark originally seen by La Condamine. It is one of the sorts imported in quantity to Europe, and is said to furnish the pale bark of the English apothecaries. It is readily known, notwithstanding the variable figure of its leaves, by their having at the axils of their veins on the under side little pits not bordered with hairs, and secreting a transparent, bitter fluid matter. Grows wild near Loxa, in the mountains of Cajanuma, Uritucinga, Boqueron, Villonaco and Monje. It also occurs near Guancabamba and Ayavaca in Peru. It is always found among micaceous schist, at elevations of from 5400 to 7200 feet; and, according to Humboldt, requires a milder climate than the *C. lancifolia* of



[Cinchona Condaminea.]

Santa Fé. The temperature of the regions which it inhabits is about that of the Canary Islands.

2. *C. scrobiculata.* Leaves oval, acute at each end, smooth, shining on the upper side, pitted underneath at the axils of the veins. The tube of the corolla downy on the outside; its limb woolly. Capsule ovate-oblong, three

times as long as broad. This is distinguished from the last not only by the form of its leaves, which never taper to the point, but also by the pits at the under side of the leaves being bordered with inflected hairs; in *C. Condaminea* they are quite hairless. It is also allied to *C. rosea*, but that species has a smooth corolla and glandless leaves. In the quality of its bark, it is not distinguishable from *C. Condaminea.* Immense forests of this species exist in the province of S. Jaen de Bracamorros. It is the commonest of all the quinas in that part of Peru, and the most esteemed; in commerce it has the name of *Quina fina.*



[Cinchona scrobiculata.]

3. *C. lancifolia.* Leaves obovate-lanceolate, very smooth on each side, without glands; panicle large, brachiate; corolla silky on the outside; capsules oblong, smoothish, five times as long as broad. (*Syn.* C. nitida, R. and P.; offi inalis, Ruiz; lanceolata, R. and P.; glabra, Ruiz; angustifolia, Ruiz.) Next to C. Condaminea this is accounted the most efficacious of all the species. It furnishes the orange-coloured bark, or the quina naranjanda of Santa Fé de Bogota, and is obviously different from the two former species, in its leaves being destitute of glands. Humboldt states that it prefers an in lement climate, on mountainous declivities, from 4000 to 9000 feet high, where the mean temperature is about that of Rome. In the Alpine forests of the upper limits of the zone inhabited by this species, the thermometer falls for hours as low as the freezing point. The plants are more rare than those of C. pubescens and magnifolia, always growing singly, and not increasing readily by the root. A kind of bark, bearing a high reputation at Cadiz, and called Calisaya, is referred to this species. It derives its name from the province where it grows, which is situated in the most southern part of Peru, in La Paz.

Another variety of this, according to Humboldt, a distinct species according to others, the Cinchona nitida of the 'Flora Peruviana,' is found only upon the coldest parts of the mountains of Peru, where it becomes a tree with a stem scarcely eight feet high. Its flowers are bright red, covered inside with a white down, and do not appear till May. Its bark, the Casc. hoja de Oliva, although of the finest quality, is never seen in commerce.

4. *C. pubescens.* Leaves ovate, very seldom subcordate, leathery, downy, or nearly smooth on the upper side, tomentose on the under side; panicle brachiate; corolla downy outside, the limb hairy inside; capsules ovate, oblong, ribbed externally, three times as long as broad. (*Syn.* C. cordifolia; ovata, R. and P.; pallescens, Ruiz; hirsuta, R. and P.) A most variable plant, yielding what is called yellow bark. It is found in the kingdom of New Grenada, in 4° N. lat., at heights between 5400 and 8650 feet; it has the name of *Quina amarilla.*

5. *C. purpurea.* Leaves broadly oval, somewhat wedge-shaped at the base, shortly cuspidate at the point, on the upper side smooth, on the under rather downy upon the principal veins; panicle large, brachiate; flowers somewhat corymbose; corolla slightly downy externally, its limb hairy inside; capsules cylindrical, becoming ovate-oblong, with longitudinal ribs, four times as long as broad. (*Syn.* C. morado.) A native of the Peruvian Andes, in the coldest and deepest part of the forests, about Chinchao, Pati, and elsewhere. It is also apparently one of the wild roots of Santa Fé de Bogota.

The very considerable size of the trees of this species, and its large membranous leaves, covered on the under side with prominent violet-coloured veins, are said by Pöppig to mark it readily. The bark, called *Casc. boba colorada*, is not in much esteem; but as it is readily collected, it can be sold at a low price, and is used for adulterating other sorts. According to Reichel, it is undoubtedly the Huamala bark of trade.

6. *C. macrocalyx.* Leaves ovate, roundish, hardly acute, quite smooth on both sides; their principal veins close together; panicles corymbose; corolla slightly downy externally, with the lobes hairy on the upper side; limb of the calyx smooth, bell-shaped, acutely five-toothed. A species distinguished by De Candolle by the above characters, but only known to him from specimens. It is found on the mountains of Peru: nothing is known of its sensible properties.

7. *C. Humboldtiana.* Leaves oval, rather obtuse, on the upper side shining, on the under between silky and downy; panicle brachiate, four-flowered; corolla silky on the outside, smooth in the throat, with its lobes shaggy inside at the point; capsules ovate, longitudinally ribbed, about twice as long as broad. (*Syn.* C. ovalifolia, Bonpl.) First described by Bonpland as identical with *C. ovalifolia* of the 'Flora Peruviana,' but afterwards recognized by him as distinct. It forms forests in the province of Cuenca, in Peru: in commerce it is called *Cuscarilla peluda*, which signifies velvet-leaved quina. Its bark is not in much estimation; it is however a good deal collected for mixing with other sorts, and Bonpland suspects it to be of good quality



[Cinchona Humboldtiana.]

8. *C. magnifolia.* Leaves broadly oval, somewhat acuminate, smooth; principal veins of the under side shaggy at the edges; panicle brachiate; corollas silky externally, capsules oblong, tapering, seven times as long as broad.

(*Syn.* C. lutescens, grandifolia, oblongifolia.) According to Ruiz, Humboldt, and De Candolle, the *C. oblongifolia* of Mutis, which produces the red bark of Santa Fé, is identical with the *C. magnifolia*, or *Flor de Azahar* of the 'Flora Peruviana.' The former grows in 5° N. lat., at the height of from 3600 to 7800 feet above the sea, and is particularly common about Mariquita; the latter occurs in the hottest parts of the Andes of Peru, about 10° south of the line. *C. oblongifolia* of Santa Fé produces a bark which, although less efficacious than that of *C. Condaminea* and *lancifolia*, is nevertheless better than that of *C. pubescens;* but this is hardly reconcilable with Pöppig's statement, that the *C. magnifolia* has a woody, not very astringent bark, and is chiefly used for purposes of adulteration: he adds, that the bark-peelers do not even reckon it a fever bark, or *Cascarilla*, but name it simply *Corteza del Azahar*. This last-mentioned author describes the tree as very stately, with unusually large white flowers, diffusing a delicious odour like that of orange-blossoms; possibly the differences adverted to are the result of climate.

9. *C. macrocarpa.* Leaves elliptical, leathery, on the upper side perfectly smooth, on the under between hirsute and pubescent; panicle trichotomous; corollas with closely pressed down on the outside; its lobes hairy inside; capsules cylindrical, twice as long as broad. (*Syn.* C. ovalifolia, Mutis.) The white bark of Santa Fé. The tree grows between 3° and 6° N. lat., at heights between 4200 and 8400 feet: a variety of it, with leaves quite smooth on both sides, is common near Santa Martha.

10. *C. crassifolia.* Leaves oblong, rather blunt, tapered to the base, leathery, smooth on each side; when young shaggy in the axils of the veins; stipules membranous, grown together; corymbs terminal, trichotomous; branches two-edged, few-flowered; fruit oval-oblong, three times as long as broad, crowned by the calyx. Found about Quito and Loxa; distinguished from *C. macrocarpa* by its peculiar membranous stipules: nothing is known of its bark.

11. *C. dichotoma.* Leaves oblong-lanceolate, smooth, when first unfolding rather silky; peduncles terminal, dichotomous, in loose few-flowered corymbs; capsules linear, cylindrical, slender, fourteen times longer than broad. Found on the Andes of Peru, in groves near Pueblo-nuevo, in the district of Chicoplaya. Its bark is described as brown, intensely bitter, with a little acidity.

12. *C. acutifolia.* Leaves ovate, acute, smooth, the veins of their under side somewhat shaggy; panicle brachiate, stalked; corolla silky outside, woolly inside; capsules oblong, tapering to the base, four times as long as broad. A native of the lower woods of the Andes of Peru, in Chicoplaya. The bark is stated to be called *Casc. de hoja aguda;* it is moderately bitter.

13. *C. micrantha.* Leaves broadly oval, blunt, smooth, rather downy underneath at the base of the veins; panicle very large, brachiate, many-flowered; corollas densely silky; capsules oblong, three times as long as broad. (*Syn.* C. parviflora.) A species inhabiting the cold elevated parts of the Andes of Peru, especially about the village of San Antonio de Playa Grande; the inhabitants call its bark *Cascarilla fina*. The tree is of considerable circumference, flowers in February, and frequently yields eight to ten arrobas of dry bark, sometimes called *Cascarilla provinciana*, which differs from that of Huanuco by its decided whitish colour and greater roughness of the surface. It is thicker and more woody, the fracture is more fibrous, and the colour is of a bright cinnamon brown. A bark, called *Pata de Gallinaze*, from the numerous specimens of Graphis, a forked sort of Lichen, found on its surface, is yielded by this sort, as well as three others. Reichel considers the samples which Pöppig brought home as undoubtedly belonging to the Huanuco bark of commerce. Its taste, which is at first acid, becomes afterwards a powerful and permanent bitter.

14. *C. glandulifera.* Leaves ovate-lanceolate; on the upper side smooth and shining, with glands at the axils of the veins; on the under side shaggy, especially upon the principal veins; panicles somewhat corymbose; corolla velvety on the tube, woolly in the inside of the limb; capsules oblong, three times as long as broad. (*Syn.* C. glandulosa.) The flowers are three lines long, and of a pale rose colour This tree only inhabits the higher mountains of Peru, and is more scarce than many of the other kinds; its trunk is from 12 to 15 feet high, and its flowers, in the month of February, fill the forests with their perfume; on the colder parts of the mountains it becomes a bush, the greatest produce from which is five or six pounds of bark. It is considered, according to Pöppig, one of the finest sorts of Cinchona; he says that the Peruvians distinguish it by its blackish rind, which is only here and there interrupted by small shagreen spots when in a fresh state. The common people consider these blotches an integral part of the bark, and look upon it as the more valuable if beneath the larger spots there appears a black shining velvety substance dispersed in ovals of some lines broad; this is probably caused by some Byssus. The bark-gatherers hence call it *Cascarilla negrilla;* when broken, it exhibits a glossy, shining, almost rosiny fracture, of a ripe orange colour passing into a fiery brown. A variety of it, called *Casc. provinciana negrilla*, is obtained from the trees growing in warm valleys. According to Mr. Reichel, this bark is equal to the finest sort from Loxa, but it is not known in Europe, except in mixture with other kinds.

* *Corollas smooth externally.*

15. *C. caduciflora.* Leaves oval, smooth, erect, hairy in the axils of the leaves; panicle brachiate, with corymbose branches; corolla smooth, falling off very quickly; capsules oblong, four times as long as broad. (*Syn.* C. magnifolia, Humb.) Found near Jaen de Bracamorros, a hot damp country, where it is called *Cascarilla bora*. The tree is described by Bonpland as being above 100 feet high; its bark is not employed.

16. *C. rosea.* Leaves oval, tapering to the base, bluntly acuminate at the point, smooth on each side; panicles clustered, branches corymbose; corolla smooth on the outside, its limb downy above; capsules oblong, three times as long as broad. (*Syn.* C. fusca.) This occurs not unfrequently about Cuchero, where it forms a highly beautiful tree, which in its size and ramification may be justly compared with the white beech of Europe; in July it is covered with innumerable pale violet flowers, whence it has obtained the name of Palo de San Juan. Its bark is not collected, but Pöppig thinks it would be found to possess good qualities.

Cinchona Barks.—Whatever may be the botanical history of the different kinds of bark, on their arrival in Europe they are known by names which have reference rather to their physical appearance, or the place whence obtained, than to the botanical characters of the trees which furnish them. In England they are classed under three heads—pale, yellow, and red barks. Of each there are several varieties, which comprehend, however, various barks, not the produce of any of the genuine species of Cinchona above enumerated, but obtained from species of Exostemma, Buena, and Strychnos (according to Mr. Burchell). These last, called false or spurious cinchona barks, are all distinguished from the true cinchona barks by the absence of cinchonia, quinia, and aricina (or Cusco-cinchonia, a principle found in the Cusco or Arica bark, referred to the Cinchona rubiginosa, Bergen). Several of these spurious barks are employed in fever and other diseases, but they are chiefly used to adulterate the more valuable kinds of cinchonas. Even when there is no intermixture of these inferior sorts, a variableness in quality occurs in the bark of the same species, according to its place of growth. The finer kinds are known by experienced persons by a glance of the eye; but it is extremely difficult to indicate, by any description, the marks by which they are guided. All kinds arrive in Europe in the same package, either a chest or serone, which is formed of pieces of wood rudely fastened together, and covered with the hides of animals. They are afterwards sorted, and bring very different prices in the markets, according to the degree of estimation in which each kind is held. We shall describe the best kind only of each; but we must remark, that much prejudice exists on this point, and sometimes excellent kinds are rejected, while inferior sorts are prized. To meet these prejudices, the barkers employ various artifices, more or less injurious. The most useful classification of barks is that proposed by Geiger, which has reference to the relative proportions of their alkaloids:—1. Those in which cinchonia predominates: chiefly pale or brown barks.—2. Those in which quinia predominates, of which there is only one—the yellow bark of English commerce, called China regia vera, China calisaya.—3. Those in which cinchonia and quinia exist in nearly equal proportions, red

barks, and the yellow bark of continental writers; the China of Carthagena of the French, China flava dura, quina amarilla. This last is also called orange bark (quina aurantiaca of Mutis), which is not the yellow bark of English commerce, though by some it is erroneously so considered; and hence the frequent error in the British pharmacopœias of referring yellow bark to the C. cordifolia (Mutis). Of the *pale* barks, three varieties are known in English commerce:—1. Crown or Loxa bark. 2. Gray, silver, or Huanuco bark. 3. Ash bark. These are always quilled, and never in flat pieces. The powder, which gives the name, varies from grey to fawn colour. The first variety, Loxa or crown bark, called also true Loxa bark, is obtained either exclusively from the C. Condaminea, or from it and C. scrobiculata. It occurs in pieces from 6 to 14 inches long, the quills varying in diameter from the fourth or even smaller part of an inch to nearly half an inch; the rolls are sometimes double, meeting at the centre: the diameter of the bark is from ½ to 1½ line. The colour of the exterior is marked dark-grey, in some specimens verging to brown. A shining but peculiar appearance is observable upon it, owing to the thallus of the lichens spreading over it. This commonly alternates with the colours of other lichens, greyish-white, yellowish-white, bluish-white, so that the bark acquires an appearance as if it were painted. Numerous transverse cracks, often extending from one side of the bark to the other, with the edges a little raised, are seen, sometimes close to each other, sometimes more remote, especially in the larger pieces, in which also they rarely extend to the whole circumference of the piece. In the larger pieces, longitudinal cracks are observed, and between these warts or knots frequently arise, which give a very rough feel to such specimens. The Usnea florida, and some foliaceous lichens, such as Parmelia perforata (Ach.), often remain attached to it. The inner surface is smooth, except some delicate, irregularly longitudinal fibres: the colour is a cinnamon or darker brown. The fracture of the smaller quills is even, or slightly fibrous; that of the larger pieces more so, the fibres firm, but neither oblique nor vitreous, as in the yellow bark (China regia); but the outer circle presents a resinous aspect. The odour resembles that of tan. The taste at first is slightly astringent, and faintly acid; afterwards very astringent, somewhat bitter, but not acrid.

In respect to its chemical composition, this variety is commonly supposed to contain cinchonia (discovered in pale bark by Dr. Duncan, jun.) only; but this is a mistake, and it is most probable that the specimens which, when analyzed, yielded no quinia, were either very thin quills obtained from young branches or trees, or were specimens of Huanuco bark. Bucholz analyzed sixteen ounces of the Loxa bark of commerce, yet found no quinia, but some error is reasonably suspected: the other constituents were found to be

	Drachms.	Grains.
Fatty matter, with chlorophylle	1·	0
Bitter soft resin (Geiger thinks this contained quinia)	2·	0
Hard resin (red insoluble colouring matter)	12·	0
Tannin (with trace of acetic acid)	3·	0
Cinchonia	0·	28
Kinic acid	1·	30
Hard resin, with phyteumacolla	1·	49
Tannin, with chloride of lime	4·	25
Gum	5·	40
Kinate of lime	1·	40
Starch, a trace.		
Woody fibre.		

The cinchonia exists in combination with the kinic acid, in the form of kinate of cinchonia. A prejudice exists in favour of the thin quilled pieces, but they are not so well adapted to form extracts, &c., nor to be employed as medicine. Mutis many years ago stated that the thick pieces obtained from branches of middle-aged trees were the most efficacious; and the analysis of Von Santen (in Von Bergen's 'Versuch einer Monographie der China') confirms the correctness of this statement, as far as the relative amount of quinia yielded by barks of different ages is concerned. From 100 lbs. of Loxa bark, he obtained of quinia

	Ounces.
Thin selected quills	1·042
Moderately thick pieces	4·444
Selected thick heavy pieces, with rough cracked bark	11·104

2. Variety or Huanuco bark, termed from its colour silver or grey Cinchona, has been known in European commerce only since 1799. The majority of writers on the origin of the barks refer it to the *C. glandulifera.* (Ruiz and Pavo, *Fl. Peruv.*) As it is sent from Huanuco to Lima for shipment, it is also called Lima bark, though some apply the term Lima to a bark supposed to come from the *C. lancifolia* (Mutis). It is likewise called Havanna bark. We have the authority of Pöppig, as stated above, for considering it one of the finest sorts of Cinchona. The variety of it termed *Casc. provinciana negrilla* (the *Quinquina Huanuco noirâtre* of the French) is likewise stated by Reichel to be equal to the finest from Loxa, yet it is not known in Europe except in mixture with other kinds. The explanation of which is two-fold: first, that though the trade in this bark was at first very brisk, owing to its excellent quality, the subsequent shipments of it being very inferior, it fell into disrepute; and though it is now again pure and good, still it is necessary to introduce it as crown bark. Farther, as the French give the name Lima bark to another kind as above mentioned, probably the dark ash bark, the dark Ten (China Pseudo-Loxa), the false Loxa bark, confessedly a very bad bark, it has caused the genuine Lima bark to be little esteemed. Farther, as the Huanuco bark is in quills which are larger and coarser than the crown bark, the prejudice in favour of thin quills operates to the disadvantage of this very excellent sort.

The quills are from three to fifteen inches, generally from four to ten inches long, with a diameter from a few lines to one or even two inches. They are in single rolls, or double and enclosed rolls; the enclosed rolls exhibit spiral windings, and frequently traces of a sharp oblique incision of the knife. This incision is not observed in the case of any other kind, and it is probably made by the *cascarilleros* to facilitate the separation of the bark from the trunk of the tree. The diameter of the bark varies from ½ to 5 lines. The epidermis is seldom absent, but now and then portions of it have been rubbed off, and then the rusty surface of the liber is seen. The epidermis is a whitish-grey, but often covered with numerous lichens, chiefly Glyphis cicatricosa, Graphis duplicata, Porina granulata, Pyrenula discolor, mastoidea, Pupulo, Lecanora punicea, Parmelia perforata, Sticta aurata, and Usnea florida.

The character of the cracks is more variable than in Loxa bark, few extending to the whole circumference of the bark; in the young pieces the cracks are not so deep as in the older, in which also the edges are raised, giving a rough appearance to it. Some specimens also between the large and extensive cracks present spaces very slightly cracked, of a golden-straw or leaden-grey colour. Huanuco bark is distinguished by the brighter colour of its surface, the multitude of its small cracks, and the sharp oblique incisions above mentioned, from the yellow or Calisaya bark (*Quina regia*), and the Loxa bark, to both of which it bears considerable resemblance. The inner surface is of a bright cinnamon, passing into an ochre-yellow or rusty hue, and is generally rough, and, especially in the thicker quills, fibrous, frequently with portions of the wood of the stem adhering to it. Though no satisfactory chemical analysis has been made of it, exhibiting its entire composition, yet the relative proportions of its alkaloids have been stated. It is the richest in Cinchonia of all the barks hitherto examined. Goebel, Kirst, and Von Santen say that it yields this alkaloid only. Michaelis maintains that two specimens analysed by him yielded, in addition, a little quinia. The quantity of cinchonia is very variable. Kirst and Goebel obtained from 1 pound 168 grains; Von Santen from nine different specimens examined by him, from 1 pound a quantity varying from 106½ grains to 210 grains. The fracture of the bark is either fibrous or splintery; that of the outer portion resinous. The odour resembles that of clay. The taste acid, astringent, somewhat aromatic; then bitter, acrid, and enduring. The powder is a deep cinnamon-brown.

The third kind of pale bark, called ash, jaen, or by corruption ten-bark, is by Von Bergen referred to *C. ovata* (R. and P.), which he considers synonymous with the *C. pubescens* of Vahl. It is likewise called pale ten-bark to distinguish it from the dark ten-bark, or false Loxa bark.

The quills of this kind are always crooked, frequently also twisted. The epidermis is frequently absent; when present, it presents faint transverse cracks, the edges of which are somewhat raised, and a few longitudinal cracks or warts. The bark itself is of an ash-grey, whitish-grey, or light yellow colour, with brown or blackish spots. It has often a slightly shining aspect. The inner surface varies very much, sometimes smooth, sometimes with long fibres attached to it, sometimes splintery, of a cinnamon or dark brown colour. The fracture is sometimes even, sometimes slightly fibrous, with a faint external resinous circle. The odour is a little like tan, and pleasant. The taste slightly acid and moderately astringent, a pure but not disagreeable bitter. The accounts of its chemical composition differ much. Von Santen says it contains neither cinchonia nor quinia. Goebel and Kirst from 1 pound obtained no cinchonia, but 12 grains of quinia; while Michaelis says in two specimens examined by him, he found both quinia and cinchonia; of the former, even 80 grains; of the latter, 12. Notwithstanding this last statement, this is generally and justly regarded as a very bad sort of pale bark, and was chiefly used to adulterate the true Loxa bark.

The dark ten-bark or China pseudo-Loxa, occurs generally in thin or middle-sized, but seldom thick, quills. The surface exhibits transverse cracks and longitudinal wrinkles, which often form rings a line or more broad. The colour is milk-white, but covered with so many lichens as to have a dark appearance. The under surface is uneven, fibrous or splintery, the fibres often very long: the colour a rusty brown. The fracture is fibrous or splintery: it exhibits a resinous appearance only when cut. Smells strongly like tan. The taste at first enduringly acid, afterwards astringent. This bark is frequently purchased instead of the true Loxa bark, and is at present of frequent occurrence in the market. Bergen considers it to be produced by the *C. nitida* (R. and P.) and the *C. lancifolia:* these are perhaps only varieties the one of the other; but whencesoever obtained, it is very poor in alkaloids, 1 pound yielding only 9 grains of kinia and 12 of cinchonia. It is held to be one of the worst kinds of pale bark.

The lichens and epidermis should be scraped off all pale barks before they are reduced to powder: though they increase the bulk, they diminish the efficiency of the powder.

The yellow barks.—There are only three kinds; the yellow bark of English commerce, which by continental writers is called merely China regia, quina Calisaya (the quinquina royal, Gelbe Königschina), and the yellow or Carthagena bark of the continent comprehending two sorts:—1. China flava fibrosa, China de Carthagena fibrosa, the quina naranjada (of the natives). The quina de Santa Fé fibrosa, or quina de Carthagena lenosa (fibrosa), of the Spanish, quina de Carthagena amarella lenhosa (fibrosa) of the Portuguese, quinquina de Carthagene fibreux, ligneux, quinquina orange (of the French), holzige gelbe china, holzige Carthagenarinde (of the Germans). —2. China flava dura, china lutea, china de Carthagena dura, quina naranjada de Sta. Fé, quina aurantiaca, quina de Santa Fé, or quina de Carthagena dura (Spanish), quina de Cartagena amarilla dura (Portuguese), quinquina de Carthagene, or quinquina flava dura (French), harte gelbe china, harte Carthagenarinde. This is the orange bark of Mutis, which he says is obtained from C. lancifolia. Bergen and Goebel ascribe it to C. cordifolia (Mutis), which some deem synonymous with C. pubescens (Vahl), which species is therefore stated alone to yield the yellow bark; but this only applies to the yellow bark of the continent, for the source of the yellow bark of English commerce must be considered as yet undetermined. We shall limit our description to this last kind, as the best known in this country, and, at the same time, the most valuable. This occurs in two forms—quills and flat pieces; the quills were formerly most prized, but all well-informed persons now prefer the flat pieces as much richer in quinia. The quills are in general in single, seldom in double rolls, the diameter of which is mostly greater than even the largest quills of pale Loxa bark, being from ½ to 1 inch, the length from 4 to 24, occasionally containing smaller quills inside the larger. The thickness of the bark varies from ⅛ to ½ of an inch. The external surface is generally grayish brown, inclining to blackish, yellowish, or whitish, according to the kind of lichen by which it is beset. Few pieces are quite free from lichens; many specimens exhibit the waxyellow thallus of *Lepra flava* (Acha.), which appears as if fused upon it: this is a very characteristic mark, when present, of Calisaya bark. The quills seldom have the epidermis removed, which has both transverse and longitudinal cracks, which penetrate down to the bark itself, as their traces can be perceived upon it even when the epidermis has been removed. The transverse cracks frequently extend over the whole circumference of the piece, yet they are much interrupted by longitudinal cracks and furrows (this is more especially the case with the thinnest quills); but all of them have raised edges, resembling those of Loxa bark. Where the epidermis is wanting, the colour of the exposed part is of a cinnamon or rusty-brown hue. The colour of the inner surface varies according to the age of the bark. Generally it is a deep cinnamon, in recent barks verging to reddish; in older specimens it is paler, or a rusty-yellow. The transverse fracture is in the thinner quills smooth, in the larger fibrous, splintery, or vitreous: a resinous circle is under the epidermis. The longitudinal fracture is generally uneven, and delicately fibrous: this kind of bark is easily broken.

The flat yellow bark, or that in splints, occurs either with the epidermis, or divested of it (China regia nuda). Pieces retaining the epidermis are generally from one to five inches broad, generally quite flat, but sometimes slightly curved, from three to fifteen inches long, and from ¼ to ¾ of an inch thick. The characters of the epidermis correspond with that above described: the uncoated kind is most frequent, and occurs in splints from one to eight lines thick. The colour varies, but is generally a reddish or rusty-brown, and is nearly the same on both surfaces, so that in pieces which have become convex on the inner side, and concave on the outer, as often happens, it is difficult to determine which was the exterior: this is by far the best kind of yellow bark.

Adulteration of yellow bark is not very easy, but a kind of humalia-like bark used to be substituted for it.

The odour of genuine yellow bark is slightly that of tan. The taste is faintly acid, strongly but not unpleasantly bitter, aromatic, stimulating, and slightly astringent.

The analyses of uncoated yellow bark (Calisaya) by Pelletier and Caventou show its composition to be super-kinate of quinia, fatty matter, slightly soluble red colouring matter (red cinchonic acid), soluble red colouring matter (more than in gray bark), tannin, kinate of lime, lignin, amylum. When the uncoated kind is analyzed, some cinchonia is obtained. By a comparative analysis it is found that a pound of flat uncoated yellow bark yields nearly twice as much quinia as the quilled sort, a point of much importance to the preparers of that alkaloid. The Carthagena yellow barks both contain quinia, but in less quantity than the Calisaya bark; the hard Carthagena bark, in addition, yields cinchonia, but not the fibrous kind.

The *red* bark, of which one kind only is known in English trade, is generally referred to C. oblongifolia; though many doubts may be held on this head. Bergen is much more disposed to consider the C. oblongifolia as the source of the China nova, or Surinam bark, which is not officinal in Britain: this also is doubtful. Red bark has been known for 130 years, but was not much used in Europe till 1779. It occurs in quills and flat pieces, most frequently in the latter form. The quills are rolled singly, or doubly, from 4 to 15, but generally from 4 to 6 inches long, and from a few lines to 1 inch in diameter, the bark being from 1 to 4 lines thick. The figure of the flat pieces is variable, being generally very much broken, frequently with the epidermis entire; but this is often partially, seldom or never completely, absent. The length is generally from 4 to 24 inches, the thickness from ½ to 1 inch, and the breadth 1 to 3 inches. The quills most frequently have the epidermis entire; some of them have a whitish yellow, or grayish white epidermis (interrupted by longitudinal and irregularly transverse cracks), a red hue shining through it. In fact, even in pieces with the epidermis entire, and covered by many lichens, the red hue is seen ever shining through—a characteristic mark of this kind of bark. The flat pieces have generally an amazing number of lichens upon them. In these pieces also what is called the rete mucosum is often very spongy. Warty bodies are found on some varieties. The inner surface is a reddish brown, varying in intensity. The fracture in thin quills is smooth, in those of a moderate thickness fibrous, and in thick quills and flat pieces fibrous and splintery: the epidermis, when pene-

trated by the resinous principle, exhibits a vitreous shining ring.

Pelletier and Caventou analyzed a specimen of the variety free from warts, and found it to contain

Superkinate of Quinia } in large quantity.
" " Cinchonia }
Slightly soluble red colouring matter, or red cinchonic acid.
Soluble red colouring matter (tannin).
Yellow colouring matter; fatty matter.
Kinate of lime. Woody fibre. Starch.

The relative proportions of quinia and cinchonia differ in different specimens; a pound of bark yielding in some instances 70 grains of cinchonia and 77 grains of sulphate of quinia, in others 184 grains of cinchonia and only 9 grains of sulphate of quinia.

The Humalies, or brown bark, is not known in English commerce; its source is not accurately determined.

Several inferior kinds, and others erroneously reputed to be cinchona barks, are met with, either accidentally or fraudulently mixed with or passed for the genuine; but they may be known by not possessing the characters of the best kinds as given above.

(Bergen, *Monographie der China; Fée, Essai sur les Cryptogames des Ecorces exotiques officinales;* Goebel, *Pharmaceutische Waarenkunde.*)

In estimating the action of cinchona bark on the human system, it deserves to be borne in mind that the resin gives it a stimulating power, the kinate of cinchonia or quinia a tonic power, and the tannin an astringent property. By the first of these it approaches the balsamic stimulants and tonics, by the second the mineral tonics, while by the third it approximates to rhatany and catechu. Notwithstanding these resemblances, its action in the aggregate is strictly peculiar, so much so that all attempts to procure a substitute for it, whether among exotic or indigenous plants, have been attended with little success. It appears to act directly upon the nerves, particularly those of organic life, but its influence is speedily extended to the vascular and muscular system.

A moderate dose of cinchona taken into the stomach, and repeated in three or four hours, is followed by increased force and frequency of the pulse, greater firmness and constriction of the arterial tunics, augmented heat of surface, a flow of perspiration, and a universally improved tone of the system. The digestive and assimilating processes are greatly expedited, and the individual feels himself fit for exertions from which he would have shrunk before. This stimulating action does not cause vertigo or unpleasant derangement of the function of the brain. The secretions of all the mucous membranes, however, are diminished, and in most persons the bowels become constipated, but occasionally an opposite state, or diarrhœa, is induced.

It is justly considered the most valuable tonic and febrifugal medicine we possess. The forms of administration are numerous. Powder is objectionable from its bulk, disagreeable taste, and difficult digestibility, owing to the quantity of woody fibre which it contains. Infusion is a good form, but does not possess all the virtues of the bark, which, however, a e all taken up by the tincture: the spirit present in this last form is often an obstacle to its being given in a sufficient dose; it is therefore generally added to the infusion or decoction. Decoction, if the process be long continued, dissipates the volatile or aromatic portion, and diminishes its powers. The tincture is often formed by the addition of other substances, as in the compound tincture of bark, which is a valuable adjunct to other remedial means in weak subjects. Acids or ammonia are sometimes given along with it, according to the nature of the complaint.

.The ease with which a small dose can be taken of the sulphates of quinia or cinchonia leads to the substitution of these preparations for that of the bark itself; and in many cases they are more eligible, but in others the want of the resinous and astringent principles renders these less proper. Perhaps the best and most convenient form, as it can be administered in a variety of ways, is one in which the bark is separated into its constituent parts, the woody fibre removed, and the other principles again united; this is called the aromatic kinate of kinia. It keeps well in all climates, is not bulky, and retains its efficacy for several years. For long voyages it is the best form into which bark can be put.

CINCHONA'CEÆ, a natural order of monopetalous exogens, with an inferior fruit, a regular corolla, seeds containing a small embryo in the midst of horny albumen, and opposite undivided leaves with stipules placed between their petioles. This brief character distinguishes a most extensive and important assemblage of plants, comprehending many of the most useful species we are acquainted with. The bark of the order is very generally tonic, aromatic, and febrifugal, and its energy is attested by the well-known use of that of Cinchona itself, to say nothing of the numerous other genera fit to be employed as substitutes for Jesuit's bark. The albumen of the seeds when roasted affords, in the case of coffee, a fragrant, stimulating, and agreeable principle; and the roots of many herbaceous kinds possess active emetic properties. True Ipecacuanha is the produce of Cephaelis Ipecacuanha, but many other cinchonaceous plants resemble it in their medicinal qualities, and are perhaps mixed with it in commerce. Cinchonaceæ are the Rubiaceæ of many botanists; but as it appears advisable to separate Rubia and its allies into a distinct order, on account of the absence of stipules, and for other reasons [STELLATÆ], it is necessary to alter the name of the remainder of the group; and as a type of the order, when circumscribed, Cinchona is unexceptionable.

CINCHONIA, a vegetable alkali contained in all the varieties of cinchona, but principally in the Cinchona lancifolia, or pale bark. In the year 1803 Dr. Duncan recognized the existence of a peculiar principle in bark, to which he attributed its antifebrile power. Gomès, in 1811, procured it in a separate state; but its alkaline properties were not discovered till 1820, when Pelletier and Caventou published their experiments upon it; (*An. de Ch. et de Ph.*, xv.) The method by which they obtained it was as follows: Four pounds of bruised pale bark were digested with heat in twelve pounds of alcohol, and this treatment was four times repeated; the spirituous tinctures were mixed, water added to the mixture, and the alcohol distilled. The turbid residue being filtered, it left upon the filter a reddish substance, which was washed with a very dilute solution of potash until it passed through colourless. The matter left in the filter, after being plentifully washed with distilled water, was of a greenish white colour, very fusible, soluble in alcohol, and crystallizable. This was cinchonia, containing however some fatty matter.

In order to purify it, it was dissolved in very dilute hydrochloric acid: a liquor of a golden yellow colour was obtained. The cinchonia was precipitated from the hydrochloric acid by magnesia, a cup of this earth being mixed with it, and the mixture digested in a gentle heat: this, when quite cold, was thrown upon a filter, and washed with water until it came through colourless. The precipitate, dried in a water bath, was treated three times with boiling alcohol, which dissolved the cinchonia; the solutions gave by evaporation crystals of a dirty white colour; these were re-dissolved in alcohol, and this solution yielded pure cinchonia by crystallization.

The properties of cinchonia are, that by slow evaporation of its alcoholic solution it is procured in slender prismatic needles; by rapid evaporation it is deposited in crystalline, translucent, colourless plates, which are not altered by exposure to the air. Cinchonia has a peculiar bitter taste, which is long in being developed, on account of its insolubility, which is so great that it requires 2800 times its weight of cold water for solution, but is rather more soluble in hot water. It is very soluble in alcohol, especially when heated, and when saturated at a boiling heat, crystals are formed on cooling; the alcoholic solution is extremely bitter. It is less soluble in æther than in alcohol, especially when cold: it does not fuse by heat till it begins to decompose. It has the alkaline property of restoring the colour of litmus, which has been reddened by an acid.

Cinchonia is composed of

20	equivalents of	carbon	6×20=120 or	78·43
11	"	hydrogen .	11	7·18
1	"	oxygen . .	8	5·23
1	"	azote , .	14	9·16
		Equivalent .	153	100

It appears from the experiments of Pelletier and Caventou, that the cinchonia, in all the varieties of bark, is combined with kinic acid; and when this salt is treated

with magnesia it is decomposed, the kinate of magnesia remaining dissolved, and the cinchonia being precipitated. Cinchonia is much more abundant in pale than in yellow bark, the latter containing much more quinia; the red bark contains both alkalis also, the quinia being in the larger quantity.

Various other methods of preparing cinchonia have been proposed: by boiling the bark in dilute sulphuric acid, adding lime, and thus precipitating cinchonia in mixture with lime and its sulphate, and dissolving the cinchonia by alcohol, and treating this solution with an acid, and an alkali, &c. (Berzelius, *Traité de Chimie*, v., 152.)

We shall mention the principal salts of cinchonia, premising that they are prepared by saturating the various acids with this base.

Sulphate of Cinchonia is prepared by dissolving the alkali to saturation in dilute sulphuric acid, and evaporating the solution till a pellicle forms; on cooling and standing the salt crystallizes. It is colourless; unalterable in the air at common temperatures; but when the temperature is raised, or the air is very dry, it becomes slightly opaque; it effloresces when exposed to a gentle heat. It is said to crystallize in rhombic octohedrons, which are rarely perfect.

Sulphate of cinchonia is soluble in about half its weight of water at 57°, and in equal weight of absolute alcohol at the same temperature: it is insoluble in æther. It is, like the other salts of cinchonia, decomposed by the alkalis, ammonia, potash, and soda, and by lime-water, all of which precipitate cinchonia. It is composed of

1 equivalent of sulphuric acid		40 or	15·09
1 „	cinchonia	153	57·73
8 „	water	72	27·18
Equivalent		265	100

Disulphate of Cinchonia may be prepared by adding the alkali to the acid to supersaturation: this salt crystallizes in rhombic prisms, which are usually short. It is soluble in about 54 times its weight of water at the usual temperature, and more so in alcohol. It consists of

1 equivalent of sulphuric acid		40 or	11
2 „	cinchonia	306	84
2 „	water	18	5
Equivalent		364	100

Nitrate of Cinchonia. Prepared by dissolving the alkali in very dilute acid; for it is decomposed by the concentrated acid. After evaporation a portion of the nitrate separates in globules, of an oleaginous appearance: if these be covered with water, they are, after some days, converted into groups of regular crystals.

Dihydrochlorate of Cinchonia. This salt is procured by adding the alkali to the dilute acid. It crystallizes in needles, which are very soluble in water. It is also soluble in alcohol, and but sparingly so in æther. It fuses below a boiling temperature. It is composed of

1 equivalent of hydrochloric acid		37 or	10·8
2 „	cinchonia	306	89·2
		343	100

According to Leibig, the neutral hydrochlorate obtained by exposing cinchonia to the action of hydrochloric acid gas, is composed of

1 equivalent of hydrochloric acid		37 or	19·8
1 „	cinchonia	150	80·2
		187	100

Kinate of Cinchonia. This, as already mentioned, is the salt which exists in the cinchona. When the solution is evaporated to the consistence of a syrup, silky acicular crystals are obtained, which are very soluble in water. For an account of some other salts of cinchonia, see Berzelius, vol. v., p. 164.

CINCINNATI, the largest town in Ohio, is situated in Hamilton county, 20 miles east of the south-western corner of the state, upon the north bank of the Ohio, and 20 miles above the mouth of the Great Miami. The town was founded in 1789, but did not become a place of any importance until after the beginning of the present century; its growth since that time has been very rapid. The population in 1800 was 750; in 1810, 2540; in 1820, 9642; in 1826, 16,230; in 1830, 24,831; and in 1831, 28,014. The rapidity of increase in the later periods is attributed to the opening of the Ohio State canals, by which the trade of the town has been greatly facilitated. With the exception of New Orleans, Cincinnati is now the largest town in the United States west of the Alleghany mountains. A great part of the trade of the town is carried on by means of steam-vessels. The number of these vessels plying on the western waters in 1831 was 198, of which 68 were built at Cincinnati. The casualties that attend this river-navigation are considerable. Of 348 steam-vessels built between 1811 and 1831, there were 87 lost by snags, burning, collision, and other accidents: during the same period, 63 steam-vessels were worn out. The registered and licensed tonnage belonging to Cincinnati at the end of 1834 amounted to 7905 tons, all of which was employed in internal navigation: of the above, 6880 tons were steam-vessels, 25 of which, of the burthen of 2459 tons, were built in 1834.

The town is situated partly on the first and partly on the second bank of the river, on a plain which occupies about four square miles, and is surrounded by a range of finely wooded hills. The height of the rising ground is not more than 50 feet from the surface of the plain.

Cincinnati is the seat of numerous manufacturing establishments; among which cotton and woollen mills, steam saw-mills, lead works, distilleries, and breweries are the most important. The Miami canal from the town to Dayton, a distance of 66 miles, has been open since the spring of 1829. A company was incorporated in 1832 for constructing a rail-road from Dayton to Sandusky on lake Erie, which, when completed, will afford communication between Cincinnati and the lake, a distance of 175 miles.

The town contained, in 1830, eighteen places of worship belonging to the episcopal church, Roman Catholics, Jews, Unitarians, Presbyterians, Methodists, Quakers, Baptists, and other denominations. The Lane Seminary, so called from the name of its earliest benefactors, who were merchants in New Orleans, stands on a small eminence called Walnut Hill, two miles from Cincinnati. Its object is principally the promotion of theological knowledge. The building is four stories, 100 feet long, and contains upwards of 100 apartments, besides a preparatory school, which is a separate building. A valuable farm is attached to this seminary, and the manual labour system is introduced: the number of students in 1832 was 88. The medical college of Ohio, founded in 1818, is situated in Cincinnati; it contained, in 1833, 110 students. A law school has recently been established in the town. There are four banking establishments, the aggregate of whose capitals amounts to five millions of dollars. The town also supports eighteen newspapers, four of which are published daily, four thrice a week, and ten weekly.

(Stuart's *Three Years in America*; *American Almanac and Companion*; *Papers laid before Congress*.)

CINCINNATI, ORDER OF, an association established at the termination of the revolutionary war by the officers of the American army, which, in reference to the transition made by most of them from the occupation of husbandry to that of arms, took its name from the Roman Cincinnatus. The society was called an 'order,' and an external badge was provided of a character similar to those worn by the knights and other privileged orders of Europe. It was moreover provided that the eldest son of every deceased member should also be a member, and that the privilege should be transmitted by descent for ever. This principle of perpetuating a distinction soon became the object of attack. Judge Burke, of South Carolina, endeavoured, in a pamphlet, to show that it contained the germ of a future privileged aristocracy, and that it should not be allowed to develope itself. The society was publicly censured by the governor of South Carolina in his address to the Assembly, and by the legislatures of three states, Massachusetts, Rhode Island, and Pennsylvania. A correspondence ensued between General Washington and Mr. Jefferson concerning the institution in 1784, and the latter expressed himself altogether opposed to the principle of hereditary descent. The public disapprobation did not run less strongly in the same direction. At a meeting of the society soon afterwards, in Philadelphia, the hereditary principle and the power of adopting honorary members were abolished; but the society, in all other respects, was preserved. According to Mr. Jefferson, General Washington used his influence

at the meeting in Philadelphia for its suppression, and the society would probably have been dissolved but for the return of the envoy whom they had despatched to France for the purpose of providing badges for the order, and of inviting the French officers to become members. As they could not well retract, it was determined that the society should retain its existence, its meetings, and its charitable funds. The order was to be no longer hereditary; it was to be communicated to no new members; the general meeting, instead of being annual, was to be triennial only. The badges were never publicly worn in America, but it was wished that the Frenchmen who were enrolled in the order should wear them in their own country. In some of the states the society still exists, and the members hold, or until lately held, triennial meetings. In others it has been allowed silently to expire. That of Virginia met in 1822, and transferred its funds (15,000 dollars) to Washington College. (Tucker's *Life of Jefferson*, vol. i., pp. 184-8.)

CINCINNA'TUS, a celebrated Roman consul. Little is known of him previous to the difficulties of his son Caeso, who, for opposing the tribunes in the performance of their functions, and for ill treating an old ex-tribune, was to be tried by the Icilian law. Sureties however were bound for his appearance. In the mean time he went into voluntary exile, and, according to Livy, the sum in which the sureties were bound was exacted from Cincinnatus. In order to pay it, he was obliged to sell nearly all his estates, and afterwards to retire to a small farm on the banks of the Tiber, where he cultivated the ground with his own hands. Being subsequently chosen consul, the messengers sent to acquaint him with his election found him engaged in the labours of agriculture. It is said that Cincinnatus, on hearing the news which they brought, was less elated by the honour his country had paid him, than grieved for the prospects of his farm during his absence. In the year of his consulship he succeeded in restoring tranquillity to the city, and establishing a partial agreement with the tribunes: the senate wished to continue him in office, but he insisted on resigning it at the close of the year, when he retired to his farm and rural occupations. Soon afterwards (A.U.C. 297) he was chosen dictator, and again received the announcement of his new honour while employed in the cultivation of his field. Conducted into Rome amidst the acclamations of the people, he forthwith marched against the Æqui, and gained a signal victory, after which he entered the city in triumph. He procured the recall of his son Caeso from exile, and then abdicated the dictatorship on the 16th day after he had received it. He afterwards headed an army against the Volsci, and added another to his former victories. In the absence of military tribunes, he was subsequently created interrex for a short time. A second time he was chosen dictator. Cincinnatus was now more than eighty years of age, and nothing but the solicitations of the consuls and senate induced him to accept the office. In all the posts which he filled at different times, his virtue and probity, as well as his patriotism and military success, gained him general admiration. Niebuhr (vol. ii. p. 289) rejects the story of Cincinnatus paying the fine of Caeso, as a mere fiction, fabricated to account for the humble circumstances of so great a man. (Dionysius Halicarnassensis, x.; Livius, iii. 26, 30, 31, &c.; Cicero, *De Fin.*, ii. 4; Niebuhr's *Rome*, vol. ii. p. 286, &c., *Engl. transl.*)

CINCINNU'RUS. [BIRD OF PARADISE.]

CINCLOSO'MA, a group of thrushes, characterized by Dr. Horsfield and Mr. Vigors. [MERULIDÆ.]

CINCLUS. [DIPPER.]

CINNA, LU'CIUS CORNE'LIUS, a Roman patrician, who belonged to the party of Marius. In 86 B.C. he obtained the consulship with Octavius, who made a strenuous opposition to his proposal for recalling Marius and his party from banishment. A dispute followed between the consuls, which was attended with bloodshed. Cinna, unable to make head against his opponents in Rome, withdrew to Tibur, Præneste, and other neighbouring towns, to seek for aid. By thus leaving his post he resigned his office, and the senate took an early opportunity to appoint another consul, L. C. Merula, in his room. Cinna, now in concert with Marius, Carbo, and Sertorius, advanced to Rome, and laying siege to the city, the senate were forced to propose a treaty, which was at last concluded. Cinna was reinstated in the consulship, and Marius was re-admitted as a Roman citizen. Marius however refused to enter the city until the sentence of banishment was formally repealed. Accordingly an assembly of the people was held; but while the votes were taking, Marius entered Rome with armed men, and forthwith proceeded to take vengeance on his opponents. Sulla's house was destroyed, and every quarter of the city was the scene of robbery and murder. Octavius, the colleague of Cinna, with many senators, fell in the massacre. The partisans of Marius were as reckless as their leader. At last Cinna and Marius themselves became desirous of putting an end to these revolting proceedings, and among other measures they seized on the consulship together. Marius died at the age of 70 years, on the first day of his entering on the office Cinna continued the usurpation which he had begun, and chose for his colleague Valerius Flaccus, to whom he assigned the province of Asia.

When Sulla had brought the Mithridatic war to a close, he contemplated returning to Italy, in order to punish his enemies. Previously however to setting sail, he sent the senate a statement of the services he had rendered and the wrongs he had suffered, at the same time threatening his enemies with his vengeance. The senate endeavoured to appease Sulla. They also attempted to moderate the fury of Cinna, but he persisted in prosecuting the war. He made himself consul, B.C. 83, with Papirius Carbo [CARBO], to whom he gave the command in Gaul. Cinna now prepared to oppose Sulla, and intended to meet him in Thessaly, by which route it was supposed he would return to Italy. The troops however were reluctant to embark, and an attempt to force them ended in a mutiny, in which Cinna was killed. C. Julius Cæsar married Cinna's daughter Cornelia. (Appian, *de Bell. Civ.*, i., 389—397; Livius, *Ept.* lxxix., lxxx., lxxxiii.; Florus, iii., 21; Velleius Paterculus, ii., 19—24; Dion Cassius *in Fragm.*; Plutarch's *Lives of Marius and Sulla.*)

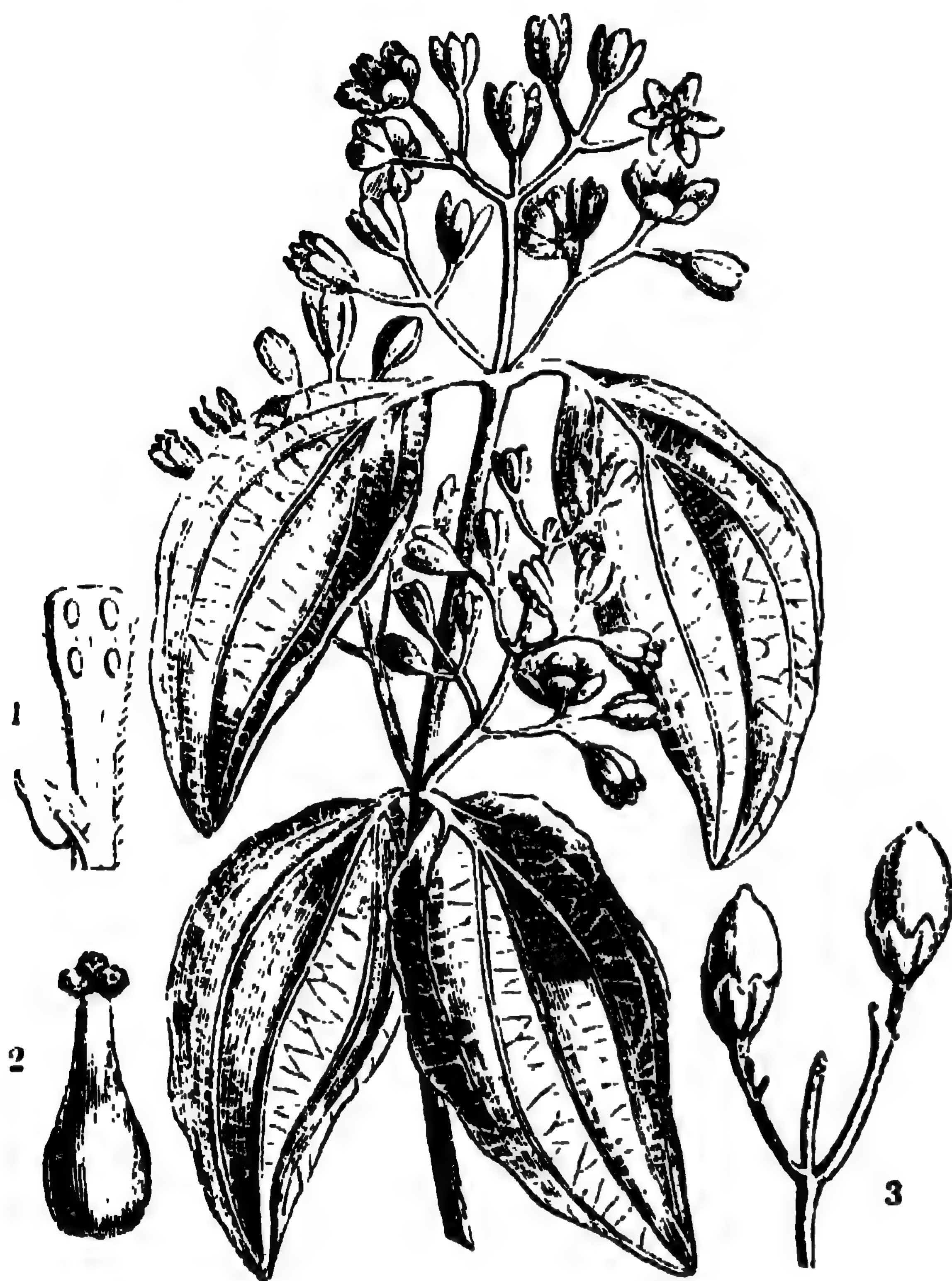
CORNELIUS CINNA, a grandson of Pompey, headed a conspiracy against Augustus, who however generously pardoned him and made him consul. Their friendship remained afterwards unbroken.

CINNABAR. [MERCURY.]

CINNAMO'MUM, an important genus of *Lauraceæ*, confined to the East Indies, and distinguished from the rest of its natural order by the following technical character:—Flowers hermaphrodite; abortive stamens perfect; anthers with four cells; limb of the perianth articulated; buds of the leaves incomplete; leaves evergreen, often approximated in pairs, three-ribbed or triple-ribbed. It contains several species, some of which yield cinnamon, and others cassia, two aromatic barks which appear to differ from each other in little, except in the degree in which the aromatic principle exists in them. Till lately it was understood that a Ceylon plant called *Laurus cinnamomum* yielded true cinnamon, and another, called *Laurus cassia*, produced the inferior cassia bark on the coast of Malabar; but, according to Nees von Esenbeck, at least two distinct species yield the cinnamon of the shops, and it is altogether uncertain which out of several yields cassia.

Cinnamon has been known to European nations from very high antiquity. The Greeks procured it, together with the name, as Herodotus (iii. 111) remarks, from the Phœnicians, who are by some supposed to have formed the name *Kinnamomon* from *Kagu-manis*, or *Kaschu-manis*, two Malayan words signifying sweet wood (*Annals of Philosophy*, Oct. 1817); and cassia itself may have originated in the same word *Kaschu*, wood. That which is now chiefly consumed in England is the aromatic bark of a small tree found in the island of Ceylon. Its leaves are of an oblong figure, generally more or less heart-shaped at the base: of a thick leathery texture, very smooth and shining on the upper side, glaucous and beautifully marked with prominent netted veins on the under side; they are always blunt, and seldom even tapered to the point; they are nearly opposite on the branches, and are traversed by from three to five ribs, of which the lateral ones run in a curved direction from the base to the point. The flowers are greenish white, and appear in threes, collected in clusters, in small terminal panicles; they are composed of a downy calyx divided into six parts, and containing nine perfect stamens and nine others which are imperfect and resemble yellow triangular-stalked glands. Their pistil is a roundish one-celled body terminating gradually in a style with a white downy capitate triangular stigma. The fruit is an oval berry, not unlike an acorn, seated in the calyx, which is

enlarged and converted into an angular six-toothed cup. The tree is supposed to produce a considerable number of varieties to which native names are given, but it is uncertain whether these are not, in part at least, distinct species. In addition to the aromatic oil contained in its bark, the root of the cinnamon tree yields camphor, the liber oil of cinnamon, the leaves oil of cloves, and the fruit a peculiar terebintaceous ethereal oil. When the branches are peeled the finest sticks of cinnamon are said to be obtained from the liber of the middle-sized branches, an inferior sort from the youngest shoots, and that which is produced by the thickest branches is considered of very little value. Of this plant, the *Cinnamomum Zeylanicum* of Nees von Esenbeck, the following is a figure —



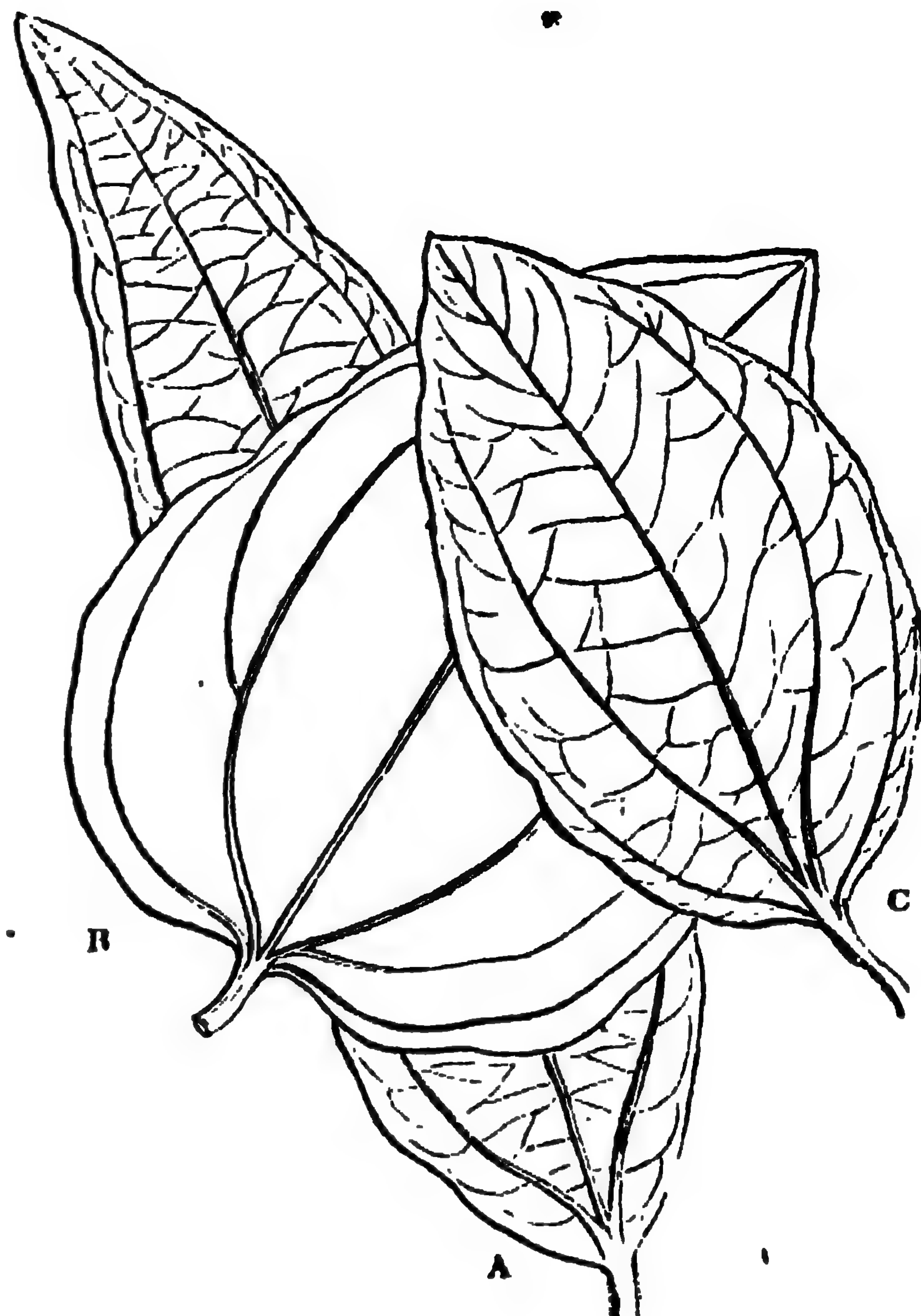
[Cinnamomum Zeylanicum.]

1, a perfect stamen, with one of the abortive stamens at its base; 2, a pistil; 3, ripe fruit.

It is said to require a rich sandy soil mixed with vegetable earth. Some degree of shade is necessary to the young plants, which therefore are not cultivated in open plains, but in spaces in the woods where a few large forest trees are left scattered about to shade them. In about six or seven years from the time they are sown, young cinnamon bushes are from four to six feet high; they are not however generally barked before the ninth year. The cinnamon peeling begins in May, at the end of the rains, and lasts till November; the operation of peeling consists in nothing more than slitting the bark longitudinally and then cutting it across, so that it can be readily turned back from the wood, and it is the more easy in consequence of the shoots which are cut for peeling not being more than three years old.

The cinnamon of China and Cochin China is believed to be the produce of a long-leaved species, called by Nees von Esenbeck *Cinnamomum aromaticum;* this plant, which is not uncommon in the hot-houses of Europe, has long been reputed the kind that yields cassia, but that opinion appears to be altogether unfounded. It is said to grow in the dry sandy districts, lying north-west of the town of Faifoe, between 15° and 16° N. lat. The leaves are very much larger than in the true cinnamon, they usually hang down from the stalks, have never more than three ribs, and never are in any degree cordate at the base; sometimes they are taper-pointed, sometimes blunt. A in the following figure is a leaf of this species; B and C are different forms of the leaf of the *Cinnamomum Zeylanicum.*

The aromatic fruits called *cassia buds* are also yielded by this species.



With regard to *Cassia lignea*, or *Cassia bark*, it seems altogether uncertain what it is that yields it; whether it is some peculiar species, as it has long been supposed to be, or inferior samples of cinnamon gathered in unfavourable seasons, or from trees growing in bad situations. The differences in cassia bark are of such a nature as to render the last the most probable conjecture; it possesses less aromatic oil, a circumstance likely to occur to trees in unfavourable situations; and in proportion as the oil disappears there is an increase in mucilaginous and resinous matter. But on the other hand there are so many inert or comparatively inert species of cinnamomum, that cassia may very well belong to one of them. There is C. dulce in China, obtusifolium, iners, Bazania, and others, any of which may possibly yield such a bark; the question is however one more of curiosity than real consequence. The only important thing about cassia was the supposing it to be furnished by what is really a most valuable species, and that error is now removed.

Cinnamon of the genuine Ceylon kind is cultivated in Guiana, the island of St. Vincent, the Cape de Verd, Brazil, the Isle of France, Pondicherry, Guadaloupe, and elsewhere, and it is said that plants obtained from Paris by the Pasha of Egypt have thriven when transported to Cairo. There is however no probability that the tree will succeed as an article of commerce in any country that has not the hot damp insular climate and bright light of Ceylon.

CINNAMON and CASSIA. There are many contradictory statements about cinnamon and cassia. In the following account we chiefly follow Fr. Ludwig Nees von Esenbeck, who has paid great attention to the subject. According to him, the finest or Ceylon cinnamon is procured from the three-year old branches of the Cinnamomum Zeylanicum (Blume), which is found native in the island of Ceylon only; the cultivation however has been extended to Java, and to South America. Though found in various parts of the island, it is most abundant in the south-west part, near Colombo, and yields the best cinnamon when growing in a sandy quartz soil. The time for stripping off the bark is from May to October. The bark, after being removed from the branches, is tied up in bundles for twenty-four hours, during which time a sort of fermentation takes place, which greatly facilitates the separation of the outer part of the bark from the cuticle and epidermis, which is very carefully scraped off the Ceylon cinnamon. It is then rolled up into quills, or pipes, about three feet in length; the thinner or smaller quills being surrounded by larger ones; a mark which always distinguishes cinnamon from cassia. It is

then conveyed to Colombo, where it is sorted by government inspectors into three kinds, of which the two finest alone were allowed to be exported to Europe, while the third, or inferior kind, was reserved to be distilled, along with the broken pieces of the other two, for the purpose of obtaining the oil of cinnamon. The select cinnamon is formed into bales of about 92½ lbs. weight, containing some pepper or coffee, and wrapped in double cloths made of hemp, and not, as stated by some writers, of the cocoa tree.

This fine cinnamon occurs in pieces about forty inches in length, generally containing from six to eight rolls or quills in each, one within the other, of the thickness of vellum paper, of a dull golden yellow colour, smooth on both outer and inner surface. It is very fragrant, agreeably aromatic, taste pleasant, warm, aromatic, slightly astringent. Analyzed by Vauquelin, it yielded volatile oil, tannin in large quantity, an azotized colouring matter, a peculiar acid, mucilage, and feculum.

The root of the cinnamon tree yields a kind of camphor, and the leaves yield an oil which resembles oil of cloves, which it is often used to adulterate. This is quite distinct from the oil of cinnamon obtained from the bark. The ripe berries yield by decoction a solid volatile oil, similar to the oil of junipers. Cassia, according to Marshall and others, is the bark of the old branches and trunk of the Cinnamomum Zeylanicum already mentioned, while others assert that it is the bark of an entirely different species, viz., of the Cinnamomum Cassia (Nees Fratres, et Blume), a native of China, but cultivated in Java. This last view is much the most probable; for not only is no cassia exported from Ceylon (except the rejected or third sort of cinnamon, which is introduced into England incorrectly under that name), but almost all the cassia which reaches Europe comes from Canton. Re-agents produce very different effects both on the infusion and oil of these two barks, which is a rational ground for believing them to be obtained from different species *.

Cassia is easily distinguished from cinnamon. The bales in which it arrives are much smaller, containing only from two to four pounds, bound together by portions of the bark of a tree. The quills are thicker, rolled once or twice only, and never contain thinner pieces within; the diameter of the bark is much thicker than that of cinnamon, and harder, the outer rind less carefully removed (large patches of the cuticle and epidermis often remaining upon it), the colour deeper, of a brownish fawn colour (that raised in Guiana is yellowish), with the odour of cinnamon, but fainter and less grateful, the taste more acridly aromatic, pungent, less sweet, at the same time more powerfully astringent, yet mucilaginous.

Cassia is often substituted for cinnamon, and it is also frequently adulterated with cassia lignea (which is the bark of a degenerate variety of the Cinnamomum Zeylanicum (Blume) growing in Malabar, Penang, and Silhet), with the bark of Cinnamomum Culitlawan, and with portions which by distillation have been deprived of their volatile oil.

Oil of cinnamon is obtained chiefly from the fragments which fall from the quills during the inspection and sorting at Colombo. These fragments are coarsely powdered, and after being immersed for forty-eight hours in sea-water, are distilled, when a milky fluid comes over, which separates into two parts, a light oil which floats, and a heavy one which sinks in the water. Eighty pounds weight of cinnamon yield about two ounces and a half of light oil, and five ounces and a half of heavy oil. About 100 gallons of oil of cinnamon are annually obtained at Colombo. As the oil which is met with in commerce is a mixture of these two, the specific gravity is variable, 1.035 to 1.090. In time a spontaneous separation takes place, and there are formed beautiful transparent crystals of a *stearopten* or cinnamon-camphor. Sometimes benzoic acid is formed. Oil of cassia is also obtained by distillation; at first it is whiter than oil of cinnamon, afterwards it becomes yellow, but never of such a fiery yellow as cinnamon-oil. The odour is agreeable, but not so delicate and cinnamon-like: taste, acrid, burning, but different from cinnamon. Specific gravity 1.0608: it reddens litmus paper. At a low temperature crystals show themselves, which disappear with an increase of heat. Some consider these a camphor, others benzoic acid. Benzoic acid unquestionably exists in this oil. Oil of cinnamon is adulterated with oil of cassia, with the oil of cassia-buds, with the oil of the cerasus laurocerasus, or cherry-laurel, and it is also said with oil of bitter-almonds, an exceedingly dangerous intermixture.

Cinnamon is an extremely valuable aromatic stimulant, and influences both the nervous and vascular system, especially of the stomach and intestines. It is of great utility in weakness of the digestive powers, unaccompanied with inflammatory action of the stomach; while in fluxes from atony of the intestines, its astringent properties, due to the tannin, render it a very useful medicine. Even in fevers of an asthenic type it has been advantageously joined with bark, and the compound cinnamon-powder is added to many medicines. Oil of cinnamon, given on sugar, is useful in cramps and other spasmodic diseases. Cassia has the same properties in less degree.

* In the Article Ceylon, p 457, the amount of cinnamon exported is much overstated A gentleman, well acquainted with the trade, informs us that up to 1833 the average annual exports were about 6000 bales, and since that time to the present, about 5000 bales.

CINNAMOMIC ACID. When oil of cinnamon is exposed to oxygen gas, the gas is absorbed, and the result is the cinnamomic acid. This acid is colourless; it fuses at 248°, and boils at about 560° Fahrenheit. It distils without alteration, and, when heated, sublimes in scales. It is slightly soluble in cold water, but more so in hot: the solution gelatinizes on cooling. It is soluble in alcohol; and water decomposes the solution, precipitating the acid. The salts of cinnamomic acid are similar to the benzoates. It is composed of oxygen, hydrogen, and carbon.

CINNY'RIDÆ, a family of honey-sucking birds of brilliant plumage. [SOUI-MANGA.]

CINNYRIS. [SOUI-MANGA.]

CINQUE PORTS. It has been a subject of controversy, whether this association of the maritime towns on that part of the English coast which approaches nearest to the continent existed in any shape before the Norman conquest of England. In the course of the late municipal inquiry, the corporation of Romney (where the records relating to the Cinque Ports generally are kept) having refused all access to the documents in its possession, the commissioners appear to have been reduced, for historical information as to the chartered privileges of the association at large, to an examination of the printed charter of Charles II., the latest general one which they received, and in which a number of previous charters, from Edward I. downwards, are set forth. This document, in the original Latin, was published in a small volume at Cambridge in 1675, under the title of *Magna et Antiqua Charta Quinque Portuum, &c.*; and in 1728 it appeared in folio, with a translation and a very full and instructive comment, written fifty years before by Mr. Jeake, long an inhabitant of one of the Cinque Ports in question. This latter book is deemed of so good authority, that the municipal commissioners, in default of original documents, have confidently availed themselves of it.

It is stated by Jeake, that in one of the records of the town of Rye is a memorandum that 'the five ports were enfranchised in the time of King Edward the Confessor;' the five ports here intended, the original *Cinque Ports* of the Normans, being the towns of Sandwich, Dover, Hythe, and Romney, on the coast of Kent, and Hastings on that of Sussex. But a stronger presumption that all or some of these towns enjoyed peculiar privileges before the Conquest, arises from the fact, that the first charter of Edward I., the earliest set forth in Charles II.'s charter, in confirming all previous liberties, expressly heads the series of kings by whom they had been granted with the name of Edward the Confessor. Only three of these five ports being mentioned in the Domesday survey, viz. Sandwich, Dover, and Romney, Lord Coke thence infers that at first the privileged ports were these three only. These, it appears from that survey, on consideration of certain services to be performed by their shipping at sea, &c., were exonerated from such contributions and burdens as other towns were generally charged with; and these, it is reasonably thought, might have been enfranchised by the Confessor at one and the same time.

Though some part of the municipal constitution of the individual ports may be anterior to the Norman invasion, yet the organization of the general body, as it has existed in later times, is plainly traceable to the policy of the Conqueror in securing, by every means, his communications with the continent. These ports and their members occupy

exactly the tract of sea-coast of which, after the victory of Hastings, he showed most eagerness to possess himself, by sweeping along it with his army before he directed his march towards London; and the surrender into his hands of the castle of Dover, which is the centre of the Cinque Ports' jurisdiction, was one of the stipulations introduced into the famous oath which, in Edward's lifetime, the duke had extorted from Harold. To enable his government to wield the resources of this maritime district with the greater vigour and promptitude, he severed it wholly from the civil and military administrations of the counties of Kent and Sussex, erecting it into a kind of palatine jurisdiction, under a *gardien*, or *warden*, who had the seat of his administration at the castle of Dover, and exercised over the whole district the combined civil, military, and naval authority; uniting in his own hands all the various functions which, to use the terms most intelligible to modern readers, we may describe as those of a sheriff of a county at large, a custos rotulorum, a lord lieutenant, and an admiral of the coast.

To the five ports of the Conqueror's time were added, before the reign of Henry III., with equal privileges, what were called the *antient towns* of Winchelsea and Rye, lying on the Sussex coast, between Hastings and Romney. To each of these seven municipal towns, except Winchelsea, were attached one or more subordinate ports or towns, denominated *members* of the principal port.

The internal constitution of each port, as well as the Norman denominations of *jurats* and *barons*, which, in lieu of *aldermen* and *freemen*, have constantly prevailed in them all since William's time, concur to show the solidity of his plan for rendering this maritime line one of the grand outworks of the conquest. The earliest members of the municipal bodies established under these foreign denominations, at a time when the English municipalities in general were subjected to the most rigorous enslavement, were doubtless trading settlers from William's continental dominions; and the term *barons*, as applied to the cinque ports' representatives, which in the later periods of English parliamentary history has usually been considered as simply synonymous with *burgesses*, did, before the several elements of the Commons' House coalesced into one homogeneous body, imply a political as well as a municipal superiority.

Until the time of Henry VII. the crown appears to have had no permanent navy: the Cinque Ports constantly furnished nearly all the shipping required for the purposes of the state, and their assistance to the king's ships continued long after that time. When ships were wanted, the king issued his summons to the ports to provide their quota. In the time of Edward I. the number they were bound to provide was fifty-seven, fully equipped, at their own cost: the period of gratuitous service was limited to fifteen days. The summons in Edward III.'s time seems to have apportioned the ships among the ports and their members: some of the members had to provide one ship: and in some cases two members had to provide one between them. It is in consideration for these services that, in the preambles of the existing charters, the peculiar privileges and exemptions of the ports are stated to have been granted. These towns, owing to various causes, have long since lost their antient importance. The physical changes that have taken place in the course of ages upon the coast-line may have had some effect. Rye and Romney, once standing on the shore, are now at some distance from it. Sandwich is only accessible for small vessels*; and the antient site of Folkestone, one of the members of Dover, has been almost wholly washed away. But the complete organization of a permanent navy involved the extinction of that description of service on the part of these ports, in consideration of which their privileges were avowedly granted; and their inferiority as ports, and their distance from all the great seats of English manufactures, sufficiently account for their present commercial insignificance. All these circumstances however have not prevented them from sustaining, until the recent measures of general reform, no inconsiderable political part.

Each of the five original ports returned two *barons* to parliament, as early as the 18th of Edward I.; Seaford, a corporate member of Hastings, sent as early as the 26th of the same reign; and the two antient towns, Rye and Winchelsea, sent as early as the 42nd of Edward III. The peculiar nature of the relation between the Cinque Ports and the crown must have given the latter, from the commencement, a very powerful influence in their internal transactions; and, in later times, when the parliamentary relations of the municipal towns came to be the grand object of solicitude to the royal prerogative, these municipalities imbibed an ample share of the prevalent municipal as well as political corruption. In the 20th of Charles II. the first open blow was struck by the crown at the liberties of the Ports in general, in the provision of Charles's charter of that year, by which the elections of all their recorders and common clerks were made subject to the royal approbation. Subsequently, in 1685, all the general charters of the Ports, and most of the particular charters of each individual town, were, by the king's special command, delivered up to Colonel Strode, then constable of Dover Castle, and were never afterwards recovered.

The lord-warden is the general returning officer for all the ports, the writs at every general election being directed to him in the same manner as to sheriffs of counties, whereupon he issues his precept for the election to the proper officer of each port. Before the Revolution of 1688 the lord-wardens assumed the power and the right of nominating one, and sometimes both, of the members for each of the port-towns having parliamentary representation; but this practice was terminated by an act passed in the first year after the Revolution, entitled 'An Act to declare the Right and Freedom of Election of Members to serve in Parliament for the Cinque Ports.' After reciting that 'the election of members to serve in parliament ought to be free,' and that 'the late lord-wardens of the Cinque Ports have pretended unto, and claimed as of right, a power of nominating and recommending to each of the said cinque ports, the two antient towns, and their respective members, one person whom they ought to elect to serve as a baron or member of parliament for such respective port, &c., contrary to the antient usage, right and freedom of elections,' it enacts 'that all such nominations and recommendations were and are contrary to the laws and constitution of this realm, and for the future shall be so deemed and construed, and hereby are declared to have been, and are void, to all intents and purposes whatsoever, any pretence to the contrary notwithstanding.' The necessity for such an enactment proves how firmly the practice must have been established; but although this statute had the effect of taking away the privilege from the lord-warden, the result was, that the Treasury influence was now enabled to return both members.

As regards the original titles to freedom in the ports, it appears, not only from general analogy and from the uniform language of the charters, but from the terms of an antient custumal of the ports received as evidence in a case of *mandamus* against the corporation of Hastings in 1736 before Lord Hardwicke, that the right to, and mode of, obtaining a freedom in each of the ports was originally uniform. The antient titles to freedom as recited in this custumal were these:—1. By birth within the town and port, if the man's father was free at the time of his birth: 2. By a freehold tenement; 3. By purchase, redemption, or gift. But at the time of passing the late Reform Act, the title to the municipal freedom (and consequently to the parliamentary franchise), by virtue of a freehold, was totally obsolete in all the port towns except Dover. Freedom by birth was allowed to all the sons of freemen at Dover, Sandwich and Hythe: at the other ports the claim of the eldest son alone was admitted; and even this, in later times, had been very much narrowed. In general, it was become the practice to admit such persons only to freedom, by election or redemption, as were either advanced in years, or for some other reason were not likely to have legitimate offspring.

Poverty also, and its attendant aptitude to passive submission, were among the principal recommendations to such admission. A freedom of a Cinque Port town was always considered as entitling its possessor to a provision of some sort. Thus at every one of the Cinque Ports there was a large custom-house establishment, including, besides the ordinary servants and retainers, five or six riding officers, and a custom-house boat, the crew of which, though rarely sailors, were always freemen. At three or four of the towns were stationed custom-house cutters, nominally to cruise against

* In fact Sandwich never could have been accessible to much larger vessels than it receives at present.

smugglers, but really to make provision for the friends of the minister, the whole body of their officers being freemen. As the salaries of the superior officers were very considerable, they had usually, according to the amount of their profits, one, two, or three of the lower class of freemen quartered on them, who were called riders—a practice which was very general as to all the Cinque Ports. Another common mode of binding the lower class of freemen to their political good behaviour was, by lending them small sums of money on bond; which, so long as they conducted themselves to the satisfaction of their superior, were never demanded, but which, if they proved refractory, were exacted with the utmost rigour.

The history of the Cinque Ports in later times presents us with some of the most glaring and flagitious instances of the sacrifice of the local well-being of the community to the interests of the various descriptions of traders in political corruption. Down to the period of the late general reform, this municipal depravation was most mischievously apparent in the composition of the local magistracies, contrasted as it was with the ample powers of judicature which they possessed. For all purposes except one or two, each corporate town of the ports possessed all the jurisdiction and arrangements of a separate county, and the circuit judges held no assizes within their liberties; each town too had its distinct rate in the nature and for the purposes of a county rate, and its civil court of record; and most of the duties analogous to those of a sheriff of a county at large were exercised separately and exclusively in each of the port towns. According to the originally uniform Norman constitution of the ports, the number of jurats in each corporation ought always to have been twelve, besides the presiding officer, each of whom was, *ex officio*, a judge both of the civil and criminal court. The mayor or bailiff, and two other jurats, however, constituted a quorum. For the reasons indicated above, it became the practice in most of these towns to keep the number of jurats as low as possible, scarcely ever exceeding four or five.

From the body of jurats in each port, or corporate member, the mayor or bailiff was elected. Before the passing of the statute 9 Anne, c. 20, which enacts that officers having the return of members of parliament (which the head of the corporation has in each of the port towns) shall not be chosen for two successive years, the same person was usually continued in the office of mayor or bailiff for a great length of time, and sometimes in a manner for life; the agent or manager of the Treasury interest in each respective borough being almost uniformly appointed to that office. This statute however had here no considerable effect; it only occasioned the substitution in alternate years of some very near relative or mere dependent of the government agent.

In order to present a distinct view of the alterations effected in the Cinque Ports' jurisdictions by recent enactments, general and local, we give a table of the ports and their detached members (distinguishing among the latter the corporate from the non-corporate) as they existed at the commencement of the present century:

Ports.	Detached Members.
Hastings.	1. Corporate town of Pevensey; distant 12 miles from Hastings.
	2. Corporate town of Seaford; distant 22 miles.
	3. Part of Bexhill parish, in Pevensey Marsh; distant 8 miles.
	4. Small part of St. Leonard's parish, near Winchelsea; distant 9 miles.
	5. Beaksbourne parish, near Canterbury; distant 48 miles.
	6. Vill of Grange, or Grench, near Rochester; distant 50 miles.
Winchelsea.	
Rye.	1. Corporate town of Tenterden; distant 10 miles.
Romney.	1. Corporate town of Lydd; distant 3 miles.
	2. Denge-marsh; distant 5 miles.
	3. Orlestone; distant 10 miles.
Hythe.	
Dover.	1. Corporate town of Folkestone; distant 7 miles.
	2. Corporate town of Faversham; distant 25 miles.
	3. Parish of St. John, containing the town of Margate; distant 21 miles
	4. Parish of St. Peter; distant 19 miles.
	5. Parish of Birchington; distant 20 miles.
	6. Parish of Ringwould; distant 5 miles.
Sandwich.	1. Corporate town of Fordwich; distant 10 miles.
	2. Corporate town of Deal; distant 6 miles.
	3. Vill of Ramsgate, including the town of that name; distant 4 miles.
	4. Vill of Sarr; distant 5 miles.
	5. Parish of Walmer; distant 8 miles.
	6. Parish of Brightlingsea; distant 40 miles.

It is probable that in very early times all the members were in some measure dependent on, or subject to, their respective ports; but in latter times there has been no connexion between any port and such of its members as have been incorporated, beyond that which exists among all the ports, excepting only the connexion between Sandwich and Deal. Each incorporated member has had within its liberty the same independent jurisdiction and municipal functions as the port itself. The unincorporated members have remained under the municipal jurisdiction of their respective ports; they have been within the jurisdiction of the criminal and civil courts, and of the magistrates and coroners of those ports; they have been summoned on the juries, and have contributed to the rates, in the nature of county rates, imposed by the justices of those ports. Yet none of the municipal franchises could be acquired in these members, nor had they any share in electing any of the officers of their respective ports; residence within them was not considered, for any corporate purpose, as residence within the port. The relation between Sandwich and Deal was peculiar. Deal was incorporated by William III., before which time it was exclusively under the jurisdiction of Sandwich. William's charter gave Deal a jurisdiction of its own; but as it did not interfere with the original jurisdiction of Sandwich, the latter retained a concurrent jurisdiction in Deal.

The jurisdiction of the Cinque Ports collectively extends along the coast, continuously, from Birchington, which is west of Margate, to Seaford in Sussex. But several of the corporate members are quite inland. Tenterden, in the centre of a rich agricultural district, has not even a river near it. Many of the unincorporated members are not only inland, but situated at great distances from their respective ports, some as far as forty to fifty miles. All the unincorporated members being exclusively under the jurisdiction of their own ports, each of those members was obliged to have recourse to the justices and coroner of its own port. Great inconvenience was experienced from this state of things, especially in those towns where the distance from the principal port was considerable.

Some part of the inconveniences above indicated was removed by the statute 51 Geo. III. c. 36, entitled 'An Act to facilitate the Execution of Justice within the Cinque Ports.' By this act three of the most remote unincorporated members, Beaksbourne and Grange (in Kent) belonging to Hastings, and Brightlingsea (in Essex) to Sandwich, were placed under the jurisdiction of the magistrates and coroners of the counties within which they are locally situated, and prisoners there were to be committed to the respective county gaols; but these members were to continue contributing to the liberty rate of their respective ports, excepting only for the maintenance of the gaols of those ports. As to the administration of justice, also, in the other unincorporated members, the act made some important alterations. By the act 54 Geo. III. c. 17, the precinct of Dover Castle was included in the jurisdiction of the town and port of Dover, from which it had formerly been distinct.

The Parliamentary Reform Act of 1832 worked a considerable revolution in the political relations of the Cinque Ports. Three of the towns, Seaford, Winchelsea, and Romney, being placed in Schedule A of that act, and Rye and Hythe in Schedule B, the number of Cinque Ports' representatives is thus reduced from sixteen to eight; Hastings, Dover, and Sandwich, still returning two members each, and Rye and Hythe one each. In the several constituencies of these five remaining parliamentary boroughs, besides the important change effected by the introduction of the household franchise, the new regulation of the parliamentary boundaries made very material alterations. Hastings and Dover have experienced the least change in this latter respect. In the case of Hastings, the two nearest of the detached members have simply been added to the 'home liberty' of the port itself, as before existing; and in that of Dover, the most populous part of one of the adjoining parishes has been added to the immediate liberty of the port. But in forming the new parliamentary borough of Rye, not only have the two 'antient towns' of Rye and Winchelsea been thrown together, but six surrounding agricultural parishes are also included within their common boundary. In like manner Folkestone, a corporate member of Dover, is now joined with Hythe, and five adjacent agricultural parishes, in composing the parliamentary borough of Hythe. And

to the antient home liberty of Sandwich are added, for parliamentary purposes, the corporate town and parish of Deal, and the contiguous parish of Walmer.

The Municipal Reform Act has operated yet more decisively to break up the antient organization of the ports, and assimilate their internal arrangements to those of the improved English municipalities at large. Of the thirteen corporate port towns, four of the least considerable—Pevensey, Seaford, Winchelsea, and Fordwich—are not included in the Municipal Regulation Act. Of the nine which are included, Dover, Hastings, and Deal, are the most considerable; each of the three, being included in Schedule A of that act, is positively to have a commission of the peace in the mode prescribed for the municipalities in general in the body of the act. The six others—Hythe, Rye, Sandwich, Faversham, Folkestone, and Tenterden—are to have a commission of the peace only on petition of the municipal council, and grant by the crown.

The jurisdiction in capital cases, formerly possessed by the ports, is abolished by the act in common with all similar jurisdictions; and as regards the limits of the authority of the courts and magistrates of the ports, provision is made by section 134 of the same act.

Antiently there were several courts, exercising a general jurisdiction over all the ports and members. The Court of Shepway was the supreme court of the Cinque Ports. The lord warden presided in it, assisted by the mayors and bailiffs and a certain number of jurats summoned from each corporate town. The following offences seem to have been cognizable within the Ports' jurisdiction by this court only: treason, sedition, counterfeiting the king's coin or seal, and concealing treasure found. It was also a court of appeal from the judgments of the several local courts. This court has been so long obsolete that even the site of it is now unknown, except that it was most probably somewhere in that central part of the Ports' jurisdiction about which lies the division of the county of Kent, still denominated 'the lathe of Shepway.' Two other antient courts are still occasionally held, the Court of Brotherhood and the Court of Guestling. The name of the former seems to indicate its purpose to have been the regulating of the affairs of the fraternity or association of the ports in general. The latter court seems to have been only a modification of the former, practised on certain occasions. The Court of Brotherhood is composed of the mayors of the five ports and two antient towns and a certain number of jurats from each of them. The Court of Guestling consists of the same persons, with the addition of the mayors and bailiffs of all the corporate members, and a certain number of jurats from each of them. It is thought that the bodies forming this addition may originally have been merely *invited* by the Court of Brotherhood to give their assistance, and that hence the assembly may have received the name of Guestling. The chairman of the court is called the speaker, and the office is filled in rotation by the mayors of the five ports and two towns, each for one year. The speaker sends a letter every year to each of the corporations composing the two several courts, asking their opinion as to the expediency of holding either of them; and if a majority answer in the affirmative, the speaker convenes the court. One of the more important functions of the Court of Brotherhood antiently was the appointment of the two bailiffs whom the Cinque Ports had the privilege of sending to superintend their affairs at Yarmouth in Norfolk, and the examination of the conduct of those officers. The securing of certain facilities for carrying on the fishery during the herring season, granted to them by charter, and enforced by successive royal ordinances, seems to have been the main object of the residence of these officers of the Ports at Yarmouth, where also, together with the bailiff of that town, they had the keeping of the peace and the care of the prison during the fair, with the power of determining all disputes and complaints. As late as the reign of Elizabeth we find traces of the contentions which were constantly arising between the bailiff of Yarmouth and the bailiffs of the Ports residing there. In the Court of Brotherhood also the arrangements and regulations were made as to the apportioning of the service of ships to the crown. In these general courts, too, assessments were made upon all the ports and members for defraying the general expenses of the association; and in them all disputes between any of the ports, towns, or members were settled, and complaints of misconduct in any of their officers were inquired into and redressed. The necessity for proceedings of this kind no longer exists; and although these courts have been occasionally held of late years, such holding seems to have been mere matter of form, excepting only the Courts of Brotherhood and Guestling, held before each coronation, at which the arrangements have been made respecting the privilege of the *barons* of the ports to hold the canopy over the king's head on that occasion; another mark of the pre-eminence among the municipalities of England given to these towns by the princes of the Norman line.

Many of the privileges set forth in the general charters of the Ports are at this day of little value. The freedom from toll and dues seems to be recognised at several ports, though at others the claim to this exemption has not been allowed, at least without an extract from the charter certified by the corporation, and a certificate from the same body that the person claiming the exemption was a freeman. The only other privileges which the freemen of the Cinque Ports in general seem now to enjoy are, the exemption from serving on county juries by reason of property out of the liberties, and that from service in the militia; both which all the inhabitants of the Cinque Ports enjoy in common with them.

It remains to notice more particularly the nature of the lord warden's jurisdiction as now exercised. One important branch of a sheriff's jurisdiction is exercised by him over all the ports and members, viz., the execution of writs and the custody of debtors. All writs out of the superior courts are directed to the constable of Dover Castle, who is always the lord warden; upon which his warrant is made out, directed to and executed by an officer called the *Lodar*. This officer, by a curious anomaly, has also the execution of writs out of the distant civil court at Hastings; and the necessity of having recourse to him has been a source of inconvenience and dissatisfaction to the latter town. The clerk of Dover Castle acts as under-sheriff. The constable's gaol for debtors is within Dover Castle; and by act 54 Geo. III., c. 97, their maintenance is provided for by an annual contribution of 300*l.*, to be levied on the ports and members in proportions fixed by the act. The lord warden has power to diminish this sum if he think it more than sufficient, and to increase it again. The money is paid over to the registrar of the Cinque Ports, who, at the time of the framing of the report of the late municipal commissioners, was the same person as the clerk of Dover Castle.

The admiralty jurisdiction of the Cinque Ports, attached to the office of lord warden, is expressly reserved in that clause of the Municipal Reform Act which abolishes chartered admiralty jurisdictions in general. A branch of this jurisdiction appears in the court of Lodemanage, so called from the old English word *lodeman*, a *lead*-man or steerer, which is held for the licensing and regulating of pilots, by the lord warden and a number of commissioners, of whom the mayors of Dover and Sandwich are officially two. The lord warden seems antiently to have held a court of chancery in one of the churches at Dover, but it has long been obsolete.

For further details, see Jeake's *Charters of the Cinque Ports; the various Statutes relating to the Ports;* Oldfield's *Representative History of Great Britain; the Reports of the Commissioners for settling Parliamentary Boundaries under the Reform Act of* 1832; *those of the Commissioners in the late Municipal Inquiry; the Parliamentary Reform Act of* 1832; *the Municipal Regulation Act of* 1835; and for a fuller view of the various causes which successively operated to vitiate the early popular constitution of these in common with the other English municipalities, as also of the recent measures of general renovation, see BOROUGHS OF ENGLAND AND WALES.

CINQUEFOIL. [POTENTILLA.]

CINTRA, a town in the province of Estremadura in Portugal, in the comarca or district of Alemquer, 12 miles N.W. of Lisbon, on the slope of the Sierra de Cintra, which is the W. extremity of the great central chain that crosses the peninsula from the Ebro to the Atlantic, and of which the Sierra d'Estrella and the Monte Junto in Portugal form part. The neighbourhood of Cintra is celebrated for its mild climate and delightful quintas, or country-houses, the resort of the wealthy inhabitants of Lisbon during summer. The kings of Portugal have a palace at Cintra, with fine gardens ornamented by numerous fountains. Several halls of the palace are adorned with historical paintings. At a short distance to the west of Cintra is the pretty valley

of Collares, which opens to the sea, and is also full of country residences. The country abounds with all kinds of fruit, especially oranges and lemons. Several convents are situated among the neighbouring hills. Cintra is known in contemporary history for the convention of 1808, by which, after the defeat of Junot by the English at Vimieira, the French agreed to evacuate Portugal. The town of Cintra has 4300 inhabitants. (Miñano, *Diccionario Geografico*, and Supplement to it.)

CI'ONUS, a genus of Coleopterous insects of the section Rhyncophora and family Curculionidæ.

Schoenherr (in his 'Synonymia Insectorum') links the present genus with the genera *Gymnætron*, *Mecinus*, and *Nanodes*, under the head Cionides, which may be considered as a sub-family: we will therefore briefly state the characters of these genera under this head, first observing that the Cionides may be distinguished from allied groups by their having the antennæ nine or ten-jointed, five of which always compose the funiculus, or that portion between the basal joint and the club which terminates the antenna.

The characters of the genus Cionus are as follows:—Antennæ short, the two basal joints of the funiculus obconic, the remainder short and truncated at the apex; the club long and indistinctly jointed: rostrum elongate, curved, inserted in a groove beneath the thorax: thorax small; elytra nearly spherical, furnished with tufts of a velvet-like nature; femora very thick in the middle; tibiæ simple, truncated at the apex.

Four species of this genus are found in England; they live, both in their larva and imago states, upon plants, more especially those of the genera Scrophularia and Verbascum.

Cionus Verbasci is about one-sixth of an inch in length, and of a deep ash colour, approaching to black: the thorax is furnished on each side with a buff-coloured patch; the elytra have four longitudinal velvet-like bands, which are black, and interrupted with grey spots; there are two velvet-black spots on the suture, one near the base of the elytra and another near the apex; the former has a yellow spot joining it posteriorly, and the latter has a spot of the same colour before and behind.

These little insects are almost spherical: when touched or approached they apply their long proboscis close to the underside of the body (where there is a groove for its reception), and also the legs, and allow themselves to roll to the ground. Their larvæ, which are of a yellowish colour, and resemble small oblong masses of jelly, may be seen in the month of August on the leaves of the Verbascum, Thapsus, and some few other plants which they feed upon. When about to assume the pupa state they enclose themselves in a little brown spherical cocoon (less than an ordinary-sized pea) formed of a glutinous substance, which is attached to the leaves of a plant; in about a week or ten days after this, the perfect insect makes its appearance.

The genus *Gymnætron* differs chiefly from *Cionus* in having the elytra somewhat ovate, sometimes depressed and not covering the apex of the abdomen, and the anterior tibiæ furnished with a minute hook at the apex. *Gymnætron Beccabungæ* is the only species found in this country.

Mecinus may be distinguished from either of the two last mentioned by the rostrum being short and thick; the thorax subcylindrical, the elytra elongate, nearly cylindrical, and covering the body; the tibiæ are armed with a hook at the apex. Three species of this genus are found in England. Mecinus semi-cylindricus is about one-eighth of an inch in length, and of a blackish colour with ash-coloured pubescence.

The genus Nanodes has the antennæ rather long, the club large; rostrum elongate, slightly bent; thorax conical; elytra subovate and humped; the anterior tibiæ unarmed. No species of this genus have yet been found in this country. (See Schoenherr's *Synonymia Insectorum,—Genera et Species Curculionidum.*)

CIOTAT, LA, a town on the south coast of France, in the department of Bouches du Rhône, about ten miles S.E. of Marseille, in 43° 10′ N. lat., and 5° 36′ E. long.

This town is said to owe its origin to two or three towers which the Catalan fishermen, who frequented the coast, built about the year 1200 to protect themselves from the piratical vessels of Barbary: these led to the formation of a hamlet, dependent upon the neighbouring village of Ceireste or Cereste; the hamlet grew to be a town, containing a busy and enterprising population. Of the time when the harbour was first formed, nothing certain is known; the *new mole* was built A.D. 1645, and the place was walled in and forts were raised for its defence a few years afterwards. Expilly estimated the population, about the middle of the last century, at 10,000, but either this statement is inaccurate or the town has declined, for the last census (1832) gives only 4345 inhabitants for the town, or 5427 for the whole commune. The water in the town is brackish, but good water is brought from a short distance by women who gain a livelihood by it.

The neighbouring territory produces abundance of delicious fruits, excellent red and white muscadel wines, and oil; and the port is frequented by numerous vessels, which come for these productions. As there is a supply of wood in the neighbourhood, a number of small vessels are built here, not only for the merchants of the town, but also for those of Toulon and Marseille. The fishermen of this coast appear to be a peculiar race, distinguished by their good sense and their activity, and by various customs: they preserve their peculiarities by their practice of intermarrying among themselves. Their sports are athletic and suitable to the life which they lead. Their disputes are decided before a tribunal of four *prud'hommes* or magistrates, chosen from among the older members of their own class, who are distinguished for good sense and integrity: the brevity and cheapness of the proceedings which take place before them and the wisdom of their decisions render their institution valuable, and it is probably owing to this that it has been maintained during the changes which have occurred in the government of France.

On the opposite side of the little bay of the Mediterranean, on which La Ciotat stands, is a place called Tarento or Taurente which D'Anville considers to be the Ταυρόεις, Tauroeis (accusative Tauroenta, Cæs., *de Bell. Civ.*, ii. 4) of the Greeks and Romans. Roman remains yet exist on this spot, but they are more probably the remains of the villa of some wealthy Roman of the fourth century than of the public buildings of the town. Tauroeis was of Phocæan origin, and belonged to Massilia, now Marseille; it never appears to have been of any importance, and was probably only a fort (Castellum Massiliensium, Cæs.) for the protection of the coast. When Trebonius and D. Brutus, the lieutenants of Cæsar, besieged Massilia, the townsmen, after their first naval defeat by Brutus, effected a junction here with the vessels of Nasidius, whom Pompey had sent to their aid.

CIOULE or SIOULE, a river in France, in the mountainous district of Auvergne. It rises on the northern declivity of Mont Dor, and flows N. and N.E. until its junction with the Allier (one of the principal feeders of the Loire) below St. Pourçain. Its whole course is above 80 miles: it is not navigable in any part of its course, except for rafts. Expilly however says that its channel only needs to be cleared of the rocks and stones which now impede the navigation to render it a valuable outlet for the agricultural produce of the district through which it flows.

CIPHER is derived from the Arabic Sifr, which originally signifies 'empty, devoid of,' and is used as a substantive to denote the figure 0.

CIPOLIN. The cipolin from Rome is a green marble with white zones. It gives fire with steel, though with difficulty. One hundred parts of it contain 67·8 of carbonate of lime; 25 of quartz; 8 of schistus; 0·2 of iron besides the iron contained in the schistus. The cipolin from Autun consists of 83 parts carbonate of lime, 12 of green mica, and 1 of iron. (Nicholson's *Chemical Dictionary*.)

CIPRIA'NI, GIOVANNI BATISTA, descended from an antient family of Pistoia, was born at Florence in 1727. He received his first instructions from Heckford, an English artist. He afterwards studied under Gabbiani; or, according to Lanzi, he studied from a collection of drawings by Gabbiani, upon which he formed his style. In 1755 he came to England, and subsequently married an English lady of moderate fortune, by whom he had three children. He was one of the original members of the Royal Academy, and was presented with a silver cup by that body in return for the design for their diploma which he furnished. He died, much esteemed, Dec. 14, 1785, and was buried at Chelsea. Cipriani executed few paintings. Lanzi mentions two, in the Abbey of St. Michael on the Sea. He employed himself chiefly in drawing designs, of which Bartolozzi engraved a great number.

CIRCÆA, a genus of small herbaceous plants, found in

woods and shady places. They have little whitish pink flowers having a tubular superior calyx, with a two-parted limb, two petals, two stamens, and an ovary with two cells, each of which contains one erect ovule. The genus constitutes the type of a section of Onagraceæ, in a reduced state. The species are commonly called Enchanter's Nightshade; but whatever supposed properties may have given rise to this name are purely imaginary.

CIR'CAETUS. [FALCONIDÆ.]

CIRCARS, NORTHERN, a large maritime province, lying between 15° and 20° N. lat., and between 80° and 86° E. long., and extending along the western side of the Bay of Bengal, from the Chilka lake on the north to the river Gondegama on the south. It has thus the district of Cuttack for its northern, and the Carnatic province for its southern boundary; on the east it has the Bay of Bengal, along a line of coast extending 470 miles; and on the west are Orissa, Gundwana, the dominions of the Rajah of Berar and of the Nizam, and the ceded Balaghaut districts. The average breadth of the province is about 80 miles, and its area about 38,000 English square miles. A continued range of mountains, impassable by carriages and difficult for horsemen, extends along the whole western frontier, from the Chilka lake on the north to the bank of the Godavery on the south. South of that river the province is separated from the Nizam's territory by a detached range of small hills. The province is watered by several small rivers, which rise among the hills forming the western frontier, and flow into the Bay of Bengal; it receives likewise the waters of the Godavery and Kistna rivers, whose mouths are within the province.

The Circars are politically divided into seven districts—Chicacole, Condapilly, Ellore, Ganjam, Guntoor, Rajamundry, and Vizagapatam. The climate of these districts exhibits a general uniformity. About the middle of June the westerly wind sets in, accompanied by moderate showers, until the end of August, when the harvest of the small grains is secured. From the beginning of September to the end of the following month the rain is more abundant; the wind is generally violent as November approaches, and then changes to the north-east, when the rice harvest, which constitutes the main dependence of the inhabitants through the greater part of the province, is housed. The season is then fair and pleasant, and at the vernal equinox the maize harvest commences. The season between the end of March and the setting in of the rains in the middle of June is hot, but the temperature is somewhat moderated by the sea breeze during the day. The soil towards the south is better than in the north. During the wars by which the Carnatic was formerly ravaged, so much of the country was suffered to be overrun with jungle as a protection from invasion, that it was always necessary to import some part of the grain needed by the inhabitants; but the security which the inhabitants have enjoyed during the last forty years has induced a larger cultivation, and they are no longer dependent upon external supplies. Fruits and garden vegetables are scarce. Sugar, cotton, and tobacco are produced; of the last, the quality of which is excellent, some part is exported. The forests upon the hills to the west contain abundance of teak wood of large growth. At the principal mouths of the Godavery ship-building is carried on, and vessels of 500 tons burthen have been constructed. From the nature of the country a great part of its trade is prosecuted in coasting vessels, the aggregate burthen of which exceeds 50,000 tons.

The district of Chicacole forms the largest portion of the recently created collectorate of Ganjam, including its capital. Exclusive of mountain streams, which are numerous during the rainy season, Chicacole is watered by four rivers, the mouths of which are at the towns of Chicacole, Calingapatam, Bimlipatam, and Vizagapatam: there are but few extensive plains in this district. The town of Chicacole, the Mohammedan name of which is Maphus Bunder, is in 18° 15′ N. lat. and 84° E. long. It is a large town, irregularly built on rising ground, forming the north bank of the Chicacole river, which rises in the mountains of Gundwana and joins the sea three miles below the town, where it is about 1750 feet broad. The centre of the town contains barracks, which are little used; and there are numerous mosques, the principal of which, a building of stone erected in the year 1051 of the Hegira (A.D. 1641), is held to be of considerable sanctity. Condapilly, called by the Mohammedans Mustaphanaghur, is separated from Ellore and Rajahmundry by the salt-water river Ooputair, which is navigable by boats as far as the Colair lake, the surplus waters of which it carries off to the sea; this it joins, after a winding course, between Samaldang and Gollapollam. The town of Condapilly, the capital of this district, stands in 16° 37′ N. lat. and 80° 33′ E. long.: this place was formerly a fortress of some strength, but the works are now in ruins. The district of Ellore, together with Condapilly last described, occupy the whole of the territory of the province comprehended between the Kistna and the Godavery. The town of Ellore, situated in 16° 43′ N. lat. and 81° 15′ E. long., is the residence of the collector of the Masulipatam district, of which collectorate this district forms a part. It is a large town; the houses not any of which exceed one story in height, are built with some regularity. Guntoor district lies between the Kistna and the Gondegama. The soil is very fertile. From the want of moisture during a great part of the year the cultivation of rice can be but little attended to, but the most luxuriant harvests of maize are raised. There are diamond mines in this district, but it is long since they have been productive. Guntoor, the chief town, is situated in 16° 17′ N. lat., and 80° 32′ E. long.; it is an extensive but irregularly built town, the walls of the houses being of mud, and the roofs of many thatched. It contains a great number of trees, and is divided into two portions by a large reservoir. The district of Rajahmundry lies on both sides of the Godavery, but principally on the north side of that river. The soil is fertile, particularly the island of Nagarum, a triangular space, comprehending an area of 500 square miles; which is formed by two great branches, into which the Godavery divides itself, thirty-five miles from the sea. Besides the two greater branches of the river by which it is enclosed, this island is intersected by five lesser branches; and the means of irrigation thus afforded, together with the slimy mould brought down by the greatest river of the Deccan, render the soil highly productive. The forests produce an abundance of teak timber: and in the plains, sugar, rice, ginger, turmeric, and various leguminous plants are raised. Cotton is also generally cultivated, but the quality is not good. The capital Rajahmundry is on the east bank of the Godavery, about 50 miles from its mouth, in 16° 59′ N. lat. and 81° 53′ E. long. The town is long but narrow, extending along an elevated bank adjoining the river. During the dry season the Godavery is here a clear blue stream, exhibiting many islands and shoals, and the banks on both sides are from twenty to thirty feet high, but in the rainy season the stream is a mile broad and very deep. Vizagapatam district, which lies to the north of Rajahmundry, is mountainous; a lofty ridge runs parallel to the sea shore, and frequently within a very short distance of it, through nearly its whole extent; to the westward of this ridge is another chain; the intermediate space is a narrow and well-cultivated valley. The town of Vizagapatam lies on the coast in 17° 42′ N. lat., and 83° 24′ E. long., near to a promontory called the 'Dolphin's Nose,' a mountain about 1500 feet high. The town contains a considerable number of well-built houses; but the situation being unhealthy the place has been almost wholly deserted by Europeans, who have retired to the village of Waltier, about 3½ miles from the town, with which it communicates by an excellent road. There is a Hindu temple of great fame and antiquity at Semachillum, near Vizagapatam.

The northern Circars were among the earliest of the territorial possessions of the East India Company; they were granted in August, 1765, by the Mogul Shah Allum, 'by way of free gift, without the least participation of any person whatever in the same;' in November of the following year this grant was recognised by the Nizam or Soubahdar of the Deccan. The district of Guntoor was, at the date of the grant, held as a Jaghire for life by Bazaulet Jung, the Nizam's brother, by an agreement with whom the company rented that district, and it did not come into their actual possession until the death of Bazaulet Jung in 1788. For the whole province the company paid to the Nizam an annual *peshcush* or tribute of seven lacs of rupees (70,000*l.*), which was redeemed in 1823 by the payment of about 1,200,000*l.*, in virtue of which the Circars are now held in full sovereignty by the British. No census of the population of the province has ever been taken; an estimate was made in 1831, according to which the number of inhabitants was a little short of three millions; but it is evident that no great reliance can be placed upon the accuracy of a

mere estimate. Mr. Sullivan, who was a resident for many years in the Madras presidency, stated rather loosely before the Committee of the House of Commons, in 1832, that according to his opinion the population of the Northern Circars was 'very little short of four or five millions of people.' The natives are represented as being a much finer class of men, both in appearance and in private character, than the natives of Bengal. The province is settled on the Zamindary system, and the old zamindars are said to be a remarkably fine and noble race of men: as regards the cultivators of the soil, they are very much on the footing of the Scottish chieftains of former days, the attachment between the two classes being continued through succeeding generations. With the exception of a few Mohammedans settled in the towns, the population of the Northern Circars is wholly Hindu. They are composed of two nations, the Telinga and the Ooria or Orissa, who speak and write different dialects, and have distinguishing customs and rites, although both adhere to the fundamental doctrines and discipline of the Hindu faith, and give undisputed pre-eminence to the Brahmins. The people have lived from time immemorial under the simple form of village government, and have preserved unaltered the names and limits of each of their villages, with its establishment of officers and servants, undisturbed by the changes which have transferred the sovereignty of the land from one set of rulers to another.

When the Circars came into possession of the English, a part of the lands were held by hereditary zamindars, and the remainder was under the immediate management of government officers: in those lands which were called *Havelee lands*, the public revenue was realized through the medium of renters to whom the rents due to government were leased for periods of years. The government has since assimilated the system throughout the province, by collecting different clusters of Havelee villages and forming them into zamindaries, which have been put up to public auction, the purchasers being entitled to hereditary possession upon payment of the revenue fixed in perpetuity upon the entire lands of the zamindary. Although these newly-created zamindars are considered by the government to be in all respects upon an equal footing with the old hereditary landholders, they are not so held by the community, but have received the distinctive title of Mootahdars, while the old zamindars are looked upon as the antient hereditary aristocracy of the country. Some of these have very large possessions, and pay a fixed annual tribute to the government of three lacs of rupees (30,000*l.*); nearly all of them reside on their estates, the management of which they retain in their own hands. The influence which they are thus enabled to exercise over the cultivators is very great, and instances have occurred where, in consequence of the tribute having fallen into arrear, the zamindary has been sold by the government, that the most serious rebellions have arisen, and the government has found it necessary, by private arrangements, to obtain back the estates from the purchasers, and restore them to the antient families. Of late, where any difficulty has occurred in paying the reserved rents, the government has taken temporary possession until its claims have been satisfied.

The revenue collected in the Northern Circars is said by Major Rennell to have amounted, in 1753, to about 43 lacs of rupees per annum. By a statement furnished by the East India Company in 1832, it appears that the revenue had then been augmented to 76,68,018 rupees (766,800*l.*), an augmentation of nearly 80*l.* per cent.

(Rennell's *Memoir of a Map of Hindustan*; Mill's *History of British India*; *Report of Committee of House of Commons in* 1832 *on the Affairs of India.*)

CIRCASSIA, or the country of the Circassians, is situated along the northern declivity of Mount Caucasus, and is now understood to comprehend the whole of this tract from the shores of the Black Sea to the vicinity of those of the Caspian, so that not only those portions which were formerly called the Great and Little Kabardia, but also the country of the Midszeges or Tchetchwenzes, who live towards the shores of the Caspian Sea, is included in it. [CAUCASUS.] The rivers Terek and Kooban, as far as their courses lie east and west, are considered as constituting the northern boundary; and the highest part of the Caucasian chain forms the southern.

The whole of this country is a succession of mountain-ridges, which branch off from the northern side of the Caucasus, and terminate near the rivers Terek and Kooban, and of valleys which lie between them. The mountain-ridges lower gradually, but with abrupt declivities as they proceed northward, and are commonly covered with wood in their lower portions. The highest of these collateral branches is that which detaches itself from Mount Elburz [CAUCASUS], runs north between 42° and 43° E. long., and terminates abruptly near 44° N. lat. with Mount Beshtan, which is 4320 feet high. This range is nearly destitute of trees, and contains a great number of warm and other springs, which are much visited, and known under the general name of Alexander's Baths. The valleys are very fertile, and generally of considerable width; but they contain numerous narrow passes, which render the access to them very difficult to an invading enemy, but tend to foster those predatory habits for which the inhabitants are notorious, and which render them the scourge of travellers and of their neighbours in the plain. The Russians, though acknowledged masters of the country, are not able to prevent their hostile excursions. Their generals and other officers have often been made prisoners, and have obtained their liberty only by paying large ransoms. To protect the adjacent plains, the Russian government has established a line of small fortifications along the banks of the Terek, Kooma, and Kooban; but 32,000 Cossacks, who are appointed to guard this line, find abundant opportunities of exercising their activity and military skill. The principal of these fortresses, Constantinogorskoë, lies south-west of Gheorghevsk, on the Podkooma, a branch of the Kooma, about 42° 40′ E. long., and 43° 50′ N. lat. Not far from it is the English missionary station of Karas, established in 1803 by the Scotch Society for Promoting Christianity, which being increased by a colony of Moravian brothers from Sarepta, now constitutes a village of 200 people. Its inhabitants are no less industrious in promoting agricultural and manufacturing industry, than in diffusing Christianity among the Circassians and Tartars; but hitherto they have made little progress.

There are no towns in Circassia, the habits of the people being opposed to the concentration of a great number of houses or of people on one spot. They live in small villages, the site of which is frequently changed. They cultivate the fertile soil of their valleys with little care; they raise millet and barley, and in some places also wheat and rye, with a small number of vegetables. The rearing of cattle is more attended to. Their horses are of a fine breed, and equally strong, swift, and beautiful; the people are proud of them, and, like the Bedouins, preserve the genealogies of their breed. The sheep, which are of the broad-tailed kind, are also much esteemed. The cattle are of a small kind. Milk, with millet, forms their principal food, and they make of it an inebriating beverage, the *koomiss*. As they are Mohammedans, they do not rear swine. Hunting is only followed by the noblemen, as a diversion.

The Circassians, or Cherkess, are the most numerous of the different nations that inhabit this country. They occupy the lower part of the mountains and valleys from the river Sundsha or Sunja on the east, to near the shores of the Black Sea. They consist of eleven tribes, independent of one another, and governed by their own hereditary princes and hereditary nobility. Their internal government resembles the feudal system. The whole population is estimated at 220,000. As the eastern portion of their country is called Kabardia, they are often called Kabardians; and it is certain that the Kabardians and Circassians belong to the same stock and speak the same language. To the east of the river Sunja live the Midszeges, also called Kistes and Tchetchenzes, who are said to be in number about 160,000. They differ entirely from the Circassians in language, but not much in character, being if possible still greater robbers. They seem to occupy the whole of the range to its very summits. The Ossetes, or, as they call themselves, Irones, occupy the higher part of the mountain range east of Mount Kazbeck, and consist of about 40,000 souls. The great road from Mozdock to Tifflis traverses their country. [CAUCASUS.] West of them are some smaller tribes, but the most western portion of the Caucasus is inhabited by the Avkhasas or Abasas, who occupy both the southern and the northern declivity, and are said to be about 240,000 in number. In their country is the small town of Anapa, which is fortified, has a small harbour, and about 3000 inhabitants. (Pallas; Reineggs.)

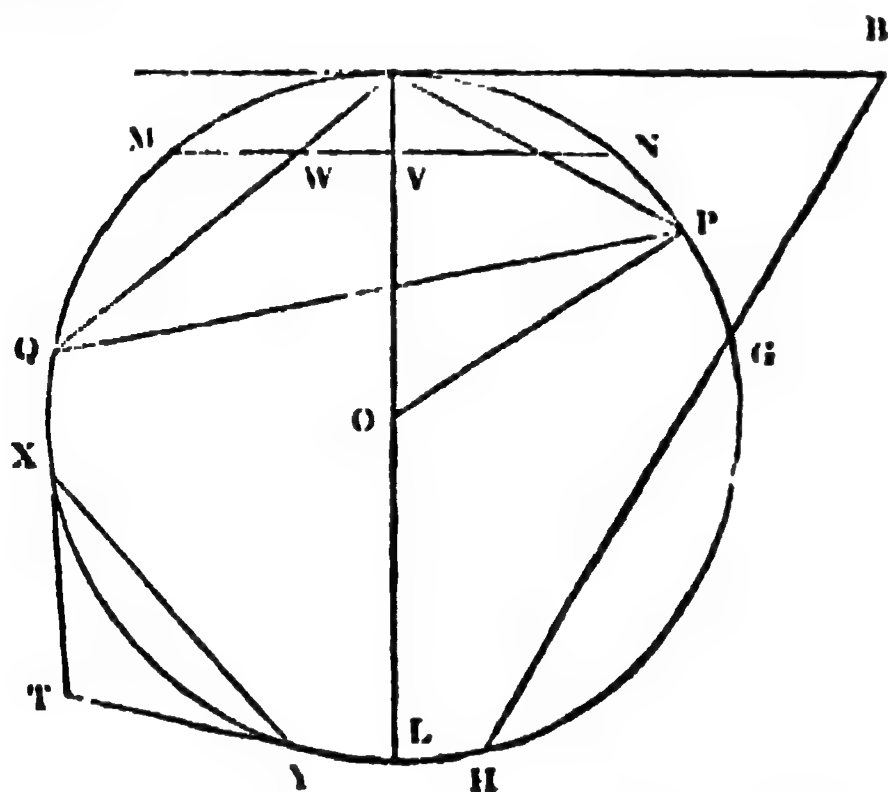
CIRCENSIAN GAMES. [CIRCUS.]

CI'RCINUS, the Compasses, a constellation of Lacaille below Centaurus, and not very far from the South Pole.

Character.	No. in Catalogue of		Magnitude.
	Lacaille.	Astron. Society.	
α	1225	1655	4
β	1271	1724	5

CIRCLE (*circulus*, a little circle, from *circus*, a ring), the figure formed by a point which revolves in a plane surface, and always preserves the same distance from a given point. The points of view under which this word might be considered are with reference, first, to its properties as a figure of geometry; second, to the history of the researches which were made for centuries, in order to discover the exact ratio of the circumference to the diameter; third, the effect of the properties of the circle upon several branches of mathematics. For the second, we refer to the word QUADRATURE; we shall give a few of the first, and a sketch of the third.

The word circle is sometimes used to denote the *circumference* or boundary line, sometimes the inclosed figure or area. Frequently a point *in* a circle means a point on the circumference; but a point *within* a circle always means a point in the interior. The *centre* is the point from which all the *radii* drawn to the curve are equal; a diameter is a double radius.



Draw a circle with a centre O, and let O A be any radius. Draw A B perpendicular to the radius, and M N also perpendicular to the radius. Take any points, P and Q, &c. Then among the most essential properties of the circle are the following:—

1. A B is a tangent to the circle.
2. M N is bisected (halved) by V.
3. The square on V N is equal to the rectangle (oblong), whose sides are A V and V L.
4. If any two chords (M N and A Q) cut in W, the rectangle, whose sides are M W and W N, is equal to that whose sides are Q W and W A.
5. The square on A B is equal to the rectangle whose sides are B G and B H, if the line B H be any line drawn through B, cutting the circle.
6. If Q move round the circle, and A and P remain fixed, the angle (opening) A Q P preserves the same magnitude throughout, namely, half of the angle A O P, and equal to the angle B A P.

These properties, with several others which are *visibly* true, are in the third book of Euclid. We name one or two others, the verification of which will be a test of correctness in drawing for those who know how to use the compass and ruler.

7. From any point T exterior to a circle, two tangents T X and T Y (of equal lengths) can be drawn. Let T be called the *pole* of X Y. Then if any number of poles be taken on the same straight line (which call the polar line), all their chords pass through the same point; which last point is interior to the circle if the polar line be altogether exterior; and exterior, if the polar line cut the circle.
8. If any hexagon, having no opposite sides parallel, be drawn in a circle, the three points of intersection made by lengthening the opposite sides must be in one straight line.

To find the circumference of a circle (with more than sufficient nearness for practical purposes), take the 113th part of 355 times the diameter (A L) or 3·14159 times the diameter. To find the area in *square* units, multiply the number of units in O A by itself, and take the 113th part of 355 times the result (or multiply by 3·14159). Given the arc A P, and the radius O A, to determine the angle A O P [see ANGLE]. And the same for the inverse question. To find the area of the sector A O P in square units, take half the product of the units in the radius and the arc A P. These are the principal questions which can be solved by a person unacquainted with trigonometry.

The influence of the properties of the circle upon abstract mathematical analysis has been so great, that an attempt to describe the manner in which the means of expression derived from this figure have been used would fill a volume. We can only here give such a description as will help the beginner in trigonometry to extend his notions of the symbols he uses. Originally the sine, cosine, &c. [TRIGONOMETRY] meant certain lines drawn in a circle, with reference to a given angle at the centre. Each angle therefore had a sine, &c. for every different length which the radius might be conceived to have. But this introducing an unnecessary complexity into formulæ, it was thought sufficient always to suppose the radius a unit, which was however always expressed. Thus in the first stage of the science we have this theorem: 'The sine of 30° is half the radius,' which in course of time took this form, 'The radius being 1, sin. 30° is ½.' This method amounted to defining the sine, &c. to be, not the lines which they originally stood for, but the numerical ratios of these lines to the radius. Thus the sine, cosine, &c. became abstract numbers. The next step was to make the angle itself an abstract number, in the manner which [ANGLE] we have called the *theoretical* method of measurement: that is, instead of measuring the angle by an arbitrarily chosen angle, such as a degree or a minute, the numerical ratio of the arc to the radius became the measure of the angle. One extension more completed the subject. Angles of more than four right angles were admitted, conceived to be made by the revolution of a point, which was considered as having made more revolutions than one. Thus any number represented some angle, and had its sine, cosine, &c. And the angles themselves being abstract numbers, and also their sines, &c., it followed that all the propositions of what was trigonometry, an application of geometry, became propositions of trigonometry, a part of pure arithmetic; retaining indeed the old names derived from geometry (names are never changed, witness the use of the term *square* in algebra), but based upon the notion of number, and the symbolic operations of algebra. Thus though it will always perhaps be thought desirable to lead the beginner through the gate of geometry, yet there must come a time, if he continue his studies to the higher branches, when he will consider a sine as a number, a function of a number; for instance, x being a number, the sine of the number x means the series

$$x - \frac{x^3}{2 . 3} + \frac{x^5}{2 . 3 . 4 . 5} - \text{\&c. } ad\ inf.,$$

or any algebraical form which is equivalent to it.

This is the point to which works on trigonometry are rapidly tending; and seeing that the student must end, if he pursue his course, in such considerations, it is most desirable that he should begin in the same manner, to every extent which is consistent with not forcing abstractions upon him too rapidly.

The ratio of the diameter to the circumference of a circle is very near indeed to that of 113 to 355, which numbers this diagram will keep in memory,

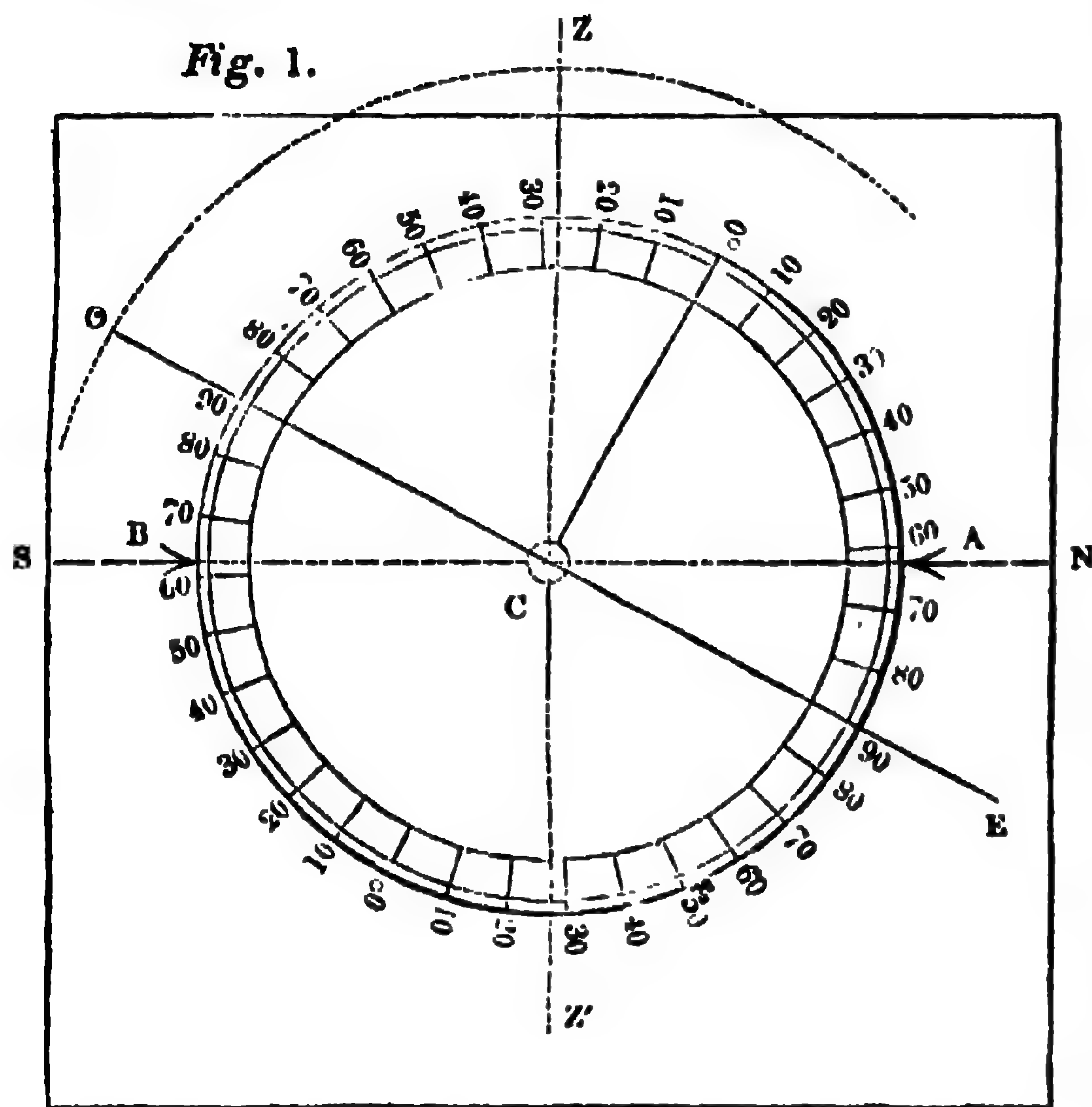
1 1 3 | 3 5 5

This method makes the circumference too great by about twenty-seven hundred-millionths of the diameter, and is therefore abundantly exact. But for common purposes, take the circumference at three times the diameter and one-seventh of the diameter, which does not err more than about one part out of a thousand of the diameter, and still in excess; that is, the circumference is a little less than twenty-two-sevenths of the diameter.

CIRCLE, ASTRONOMICAL. Though almost all the astronomical and geodesical instruments which are at present

used in measuring angles, are composed of entire circles, the term *astronomical circle* is ordinarily confined to those instruments of which the sole or principal use is the measurement of angles of altitude or zenith distance. In the present article we shall adopt this limitation, and restrict ourselves still further to a description of the construction and use of those circles which are either fixed in the plane of the meridian, as the *mural* and *transit* circles, or which continue to have the plane of the principal circle vertical, though turning upon an axis, as the *altitude* and *azimuth* circle. For other instruments which might be included under the term circular, the reader must consult the articles EQUATORIAL, REPEATING CIRCLE, and THEODOLET.

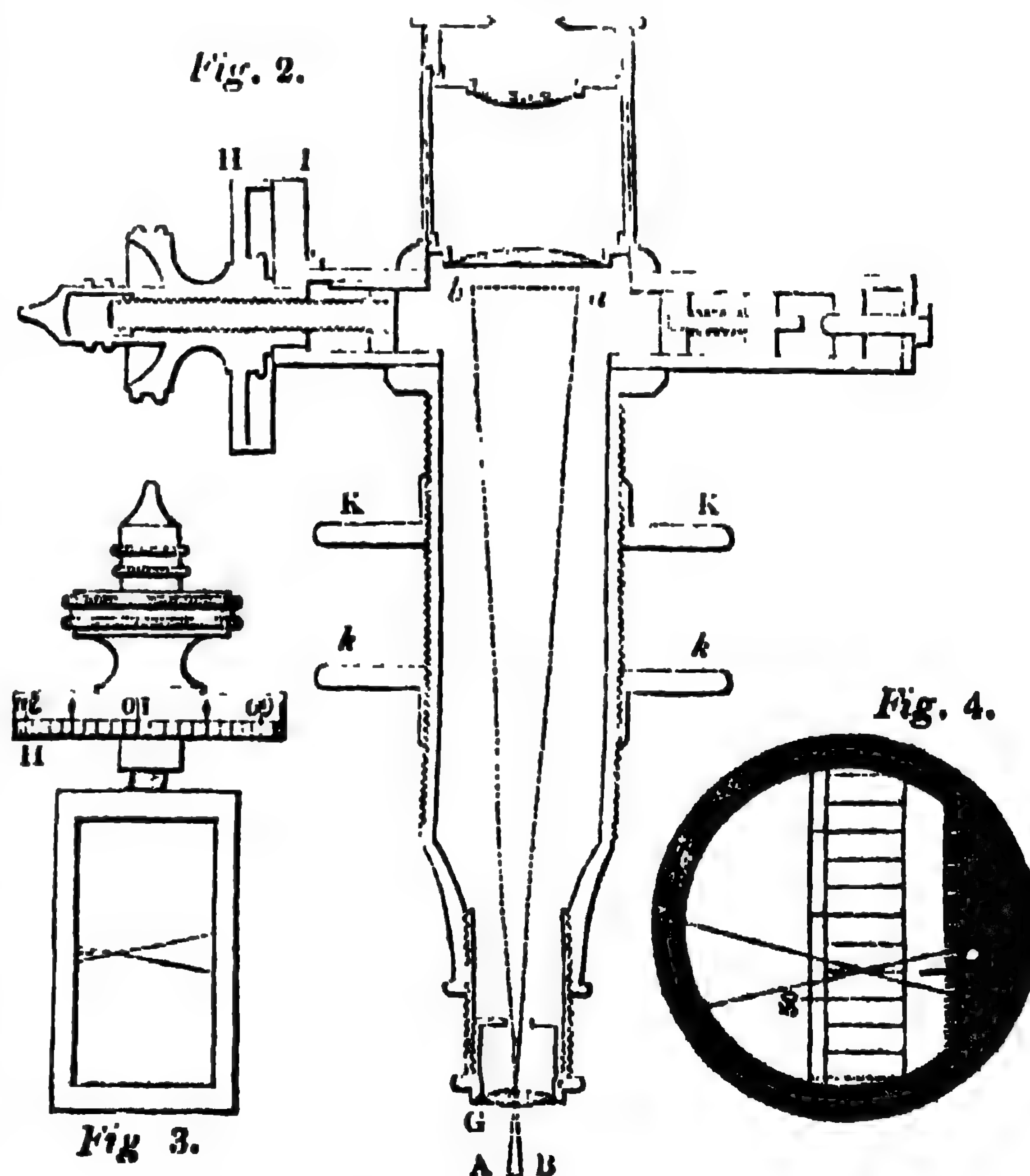
This article will be more intelligible with some preliminary explanations.

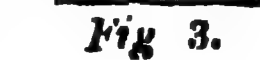


Let a circular plate, divided into 360°, turn round a concentric axis C, fixed into the block SN, so that the line EO, moving with the circle, and in which direction the observer is supposed to look, can be placed in any direction up or down. A and B are two pointers attached to the block, and in a line passing through the centre. The block and circle are supposed to be upright, the axis C and the line AB horizontal. Also when the line of sight is vertical, or EO coincides with Z′Z, 0° of the divisions ought to be exactly under the pointer A. It is evident when the line of sight is moved through any angle into the direction EO, that C 0° must have moved through an equal angle, and that the ∠ ZCO = ∠ AC0°, or the arc A 0°. Hence if an object is seen in the direction E O, its *zenith distance* ZCO will be the angle pointed out upon the divided circle by the pointer A. This angle is technically called the *reading* of A. The line EO represents the direction of plain sights, or the line of sight of a telescope, sometimes called the *line of collimation* (from *collimare*, said by Facciolati to be a mistake for *collineare*).

If when EO is vertical, A points a little above or below the 0°, or zero of the divisions, the difference from 0° is called the *error of collimation*, which may be corrected by shifting the position of A; but when the quantity and direction of the error are known, there is no need to make any alteration. For instance, let A point to 2° when the line of sight is vertical, then it is evident that when the line of sight is in the direction EO, the zenith distance will be equal to the arc from 2° to A, or 2° must be *subtracted* from the *reading* of A. If EO be directed anywhere between Z and N, then 2° must be *added* to the readings of A. In fact the pointer may be placed anywhere in the circumference of the circle, and the divisions may commence in any part of the circle without at all affecting the accuracy of the measurement of angles of zenith distance; but a very large error of collimation would be inconvenient in practice. The second pointer B, if exactly in a diameter with A, and the divisions perfect, would evidently give the same result as A. This also may have an error of collimation, which may be treated precisely as that of A; or rather, the error of collimation for the *mean* of two or more pointers is determined at once and by the same operation. Two readings have this advantage over one, that if some of the divisions should be erroneously placed, it is not likely that equal errors in the same direction should fall at the same time under both pointers; and in any other supposition, the mean of the two readings will be affected by a less error than one of them. Hence the advantage of multiplying the readings for lessening the errors of division; it is evident that what is improbable for two, will be all but impossible for six, which is the number used in the Greenwich circles. There is however another and more sensible advantage in two opposite readings above one. Conceive the whole circle to be moved towards Z, or Z′, or pushed sideways towards N, or S; still so long as EO continues to be parallel to itself, which it must be if it continues to be in the direction of a very distant object, the sum of the readings of A and B will remain the same; whatever one loses the other will gain. Hence it is not necessary that the axis should be truly circular, or that the centre of the axis should be exactly concentric with the centre of the divisions, which last requisite is not easily accomplished in the present construction of English dividing engines. In all circles which have readings diametrically opposite to each other, the observer ought to consider each *pair* as only *one* reading of a *diameter*, and not as two unconnected readings. There is another form in which a circular instrument for measuring altitudes may be constructed; the divided circle may be fixed to the block, and the line of sight, EO, turn upon the axis C. In this case the pointers must be connected with EO, and revolve on the same centre. All the previous remarks are equally applicable.

The operation of noting the angles, or of *reading off*, has been described in its rudest form, as it seems to have been practised by the Greeks. We must here explain somewhat more minutely the use of the micrometer microscope. (For other modes of subdivision, see VERNIER.)





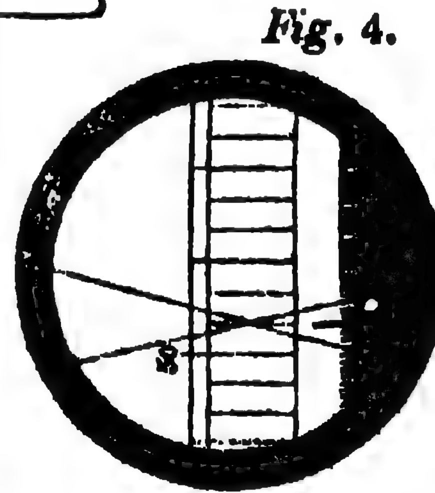


Fig. 2 is a *micrometer microscope*. AB is supposed to be the space between two divisions of the circle which is generally equal to 5′. The object glass G, which is sometimes, and with great benefit, made achromatic, forms at *ab* an inverted image of AB, as *ab*. Within the body of the microscope there is a slide, represented in Fig. 3. This slide is drawn forwards by a fine screw (generally of 100 threads to an inch), while it is held back by a spring to avoid *lost time*; it has two fine wires crossing at an acute angle as in the figure. The image *ab* should fall exactly on this cross, and the two lens eye-piece should be so placed as to give distinct vision of both. Also five revolutions of the screw should move the cross *exactly* from any division of the circle to the neighbouring one. The circular plate H is fixed by friction upon the head, and is divided into 60 parts, which correspond to seconds on the circle, and are

read off by a pointer, I. The entire revolutions of the screw are counted by a sort of comb, or indented plate fixed near the wires, but not movable with them. There is a little projecting tongue of metal opposite the cross wires, which is seen between the teeth of the comb at each whole revolution of the screw. This microscope having its parts at the proper distance from each other, and being placed at the proper distance from the divided circle, must be supposed to be substituted for the pointer A, in Fig. 1; the tongue at 0 in the comb, and the zero of the divided head opposite to its index. If a division of the circle seems exactly to cut the cross at the angular points, the observer has only to note what division of the circle it is, and that is the reading, just as with the simple pointer. Generally however one division will appear above, and another below the cross. Since the divisions are seen inverted, the division apparently below the cross is the one really above, which, according to Fig. 1, and the position E O, is the division immediately less than the position of the microscope or pointer. Turn the screw round until the appearance is exactly the same as in Fig. 4, and suppose that the tongue has moved over two teeth, showing two revolutions of the screw, and the index is half way between 33 and 34 on the divided head, then 2′ and 33″·5 are to be added to the degrees and minutes of that division. Now that division is 50° 5′, therefore the true reading is 50° 7′ 33″·5. What has been said as to error of collimation holds good with a microscope as with a pointer. When the line of sight E O falls between Z and N, then the next least division will be really below, but apparently above the cross, and the measurement should be made to it. The screw in this case must be turned the other way, and instead of the divisions of the head shown by the index, their difference from 60 must be taken for the seconds. A little caution and experience will guard the observer against mistake. The length of the microscope can be altered by screwing the tube in which G is fixed, and the microscope can be shifted in its support to and from the circle by the nuts K K, *k k*. It is evident that by these two movements the size of the image can be altered as well as its situation with respect to the cross wires. (See the figure of the altitude and azimuth circle for the mode of mounting the micrometer.) The apparatus of the micrometer microscope, shown at Fig. 3, is frequently attached to the eye end of a telescope, and is placed in the focus of the object glass. The wires are then placed across the slide and at right angles to it, so as to be parallel with other wires of the telescope. If these points are clearly understood, the reader will find no difficulty in understanding the rest of this article. [See MICROMETER.]

The earliest application of a circle to astronomical purposes is described by Ptolemy (*Almag.* i. 10), who calls it from its use, a solsticial circle. This consists of a smaller circle turning freely within, and in the same plane with a larger and fixed divided vertical circle. Two small projecting prisms are placed in a diameter of the inner circle for a line of sight, and pointers are also fixed on the inner circle which move on the face of the outer circle. The instrument thus formed is to be carefully adjusted by a plumb line and meridian line in the plane of the meridian. In observing the sun, the inner movable circle was turned round until the shadow of the upper prism exactly covered the lower prism, when the pointers marked the corresponding division upon the outer fixed circle. The inner circle seems to have been employed as the most accurate mode of giving a rotatory motion to the *line of collimation*, concentric with the divided circle. If a bar, carrying the line of sight and the pointers, be supposed to revolve on an axis, it is the second case of Fig. 1. The language of Ptolemy does not inform us who was the inventor of this instrument, or even that it was ever made or used. Delambre conjectures with some probability, that it is due to Eratosthenes, though he inclines to think that the celebrated measure of the obliquity of the ecliptic by that astronomer, viz., that the distance between the tropics is equal to $\frac{11}{83}$ of the circumference, was deduced from observations with the gnomon. However that may be, it is certain that the *solsticial circle* was the best-contrived instrument of which we find any account until the time of Roëmer; and it bears, as will be seen, a very close analogy to the modern mural circle of Troughton.

Except the complicated astrolabe of Hipparchus, which consisted of five concentric circles, so contrived as to have one circle in the plane of the ecliptic, and another at right angles to it, we do not find the entire circle employed in large instruments before the time of Tycho Brahé, and then only for an equatorial. The supposed authority and example of Ptolemy, who proposed a quadrant, and the desire of increasing the sensibility of instruments, by enlarging the scale of the divisions, blinded astronomers to the more solid advantages of the entire circle.

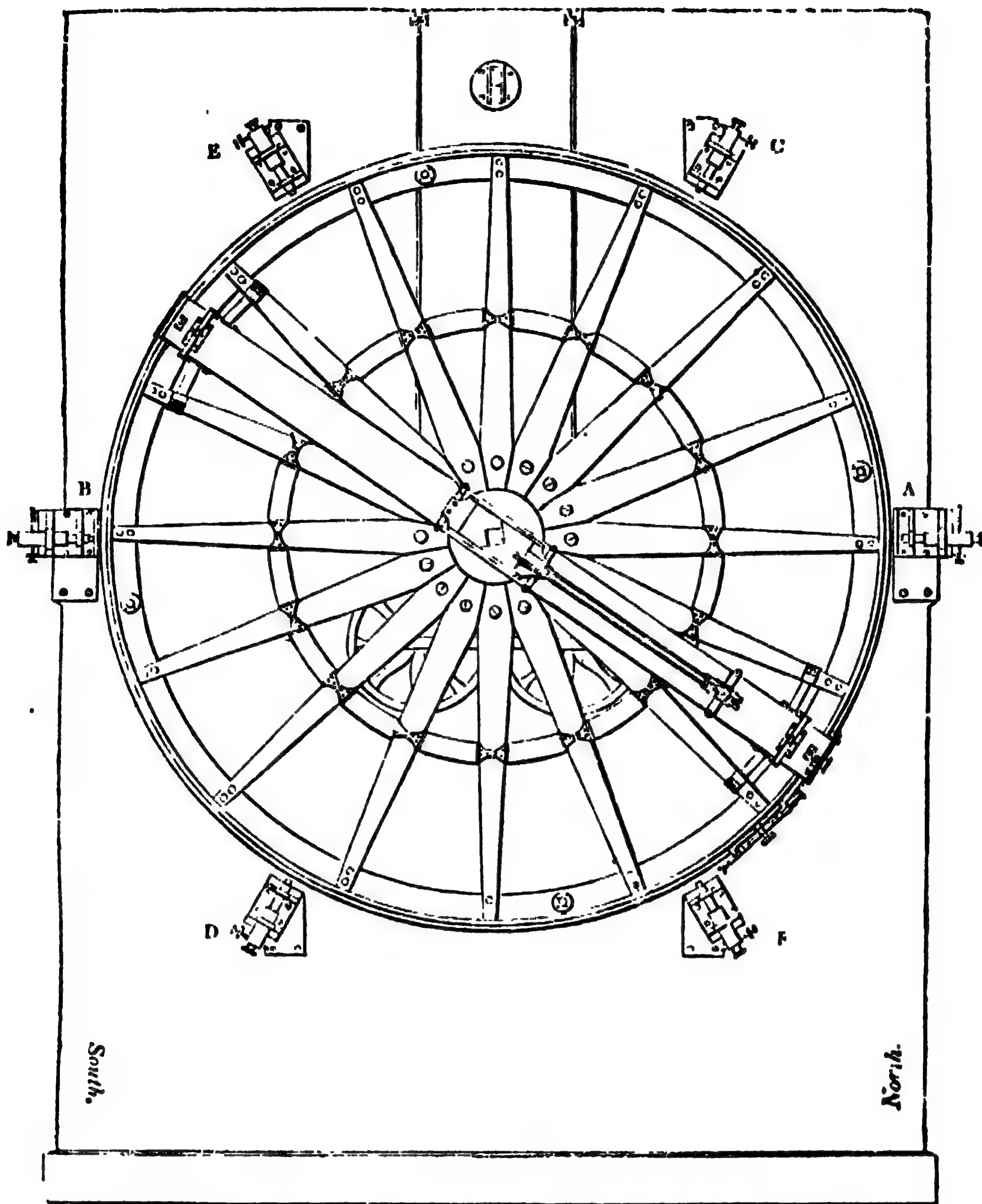
In 1704 Roëmer erected his *Rota meridiana*, or *transit circle*, in his private observatory 1ᵐ due west of the astronomical tower of Copenhagen. He had invented the simple transit and the altitude and azimuth circle about fourteen years earlier, and in this new instrument he very happily combined the qualities of a transit telescope with those of a meridian altitude circle. In a letter to Leibnitz, 15th December, 1700, he had already said, 'that the quadrant and sextant ought no longer to be used, and that he would rely more on an entire circle of four feet than on a quadrant of a ten-feet circle.' (*Miscell. Berolin. continuat.* ii. p. 276.) A description and figure of the Rota meridiana are to be found in the *Basis Astronomiæ*, p. 143, Tab. viii., of his pupil Horrebow, *Hafniæ*, 1735, with a specimen of three days' observations. The altitude and azimuth circle is described in p. 43, and figured in Tab. ii. of the same work.

The *Rota meridiana* of Roëmer was a divided circle set upon a hollow double cone, at right angles to the axis of the cones, and concentric with them, the circle being near one end of the axis. The divisions were read by two microscope verniers, fixed in a diameter of the circle on one of the supports of the axis. For general purposes, this is perhaps as well a designed instrument as has ever been constructed, yet it was not imitated till about three or four years ago, when a similar construction was recommended by Mr. Pond, and adopted for the observatory at Paramatta. A second on a much larger scale is just finished for the observatory at Oxford; both these are by Mr. T. Jones. Notwithstanding the advice and practice of Roëmer, it does not appear that the entire circle was used for astronomical purposes until Mayer proposed his *repeating reflecting circle*. His description was published in 1770 (*Tabulæ Solares*, p. 21, plate ii.), but the repeating reflecting circle did not come into use until modified and perfected by Borda about 1787.

In 1784 the Danish astronomer Bugge published his *Observationes Astronomicæ, Hauniæ*, in which he gives a figure and description of a vertical circle of four feet diameter revolving in azimuth, p. liii., Tab. viii. and ix.; it seems a smaller one had been used in the survey of Denmark as early as 1762.

Ramsden undertook an altitude and azimuth circle for the observatory of Palermo in 1788, and completed it 1789. This is described by Piazzi (*Della Specola Astronomica di Palermo*, 1792), with four plates of the instrument and its details. (See too *Pearson's Astronomy*, vol. ii., p. 413, plate xxiii.) It is with this circle that the declinations of Piazzi's celebrated catalogue were determined. In 1792 Troughton perfected his altitude and azimuth circle; and in 1793 Mr. Francis Wollaston published in the *Philosophical Transactions* a description, with a plate, of his transit circle: Borda's repeating circle seems to have been first used about 1787, in connecting the meridians of Paris and Greenwich. The advantages of the circular form were now appreciated; its superior strength and symmetry, the elimination of any error of excentricity by opposite readings, and the diminution of errors of division by increasing the number of readings, or by reversing the instrument, were placed beyond dispute. Various alterations were made in parts of these instruments, and new contrivances and conveniences applied, but nothing very novel in principle was struck out till Troughton erected a six-feet mural circle at Greenwich in 1812. After some controversy this form has been generally adopted in those British observatories which can afford a second observer for the transit.

The limits of the present work will not allow a detailed account of any one instrument, and still less a description of the numerous variations which have been introduced according to the views of astronomers and artists. We shall give a general view of the two most essential forms, the mural meridian circle and the altitude and azimuth circle, as constructed by Troughton and his school.



[Greenwich Mural Circle, by Troughton; diameter six feet.]

The accompanying figure of the mural circle of Troughton is copied from that prefixed to the Greenwich Observations for 1812, with the subsequent alterations. The circle is framed as strongly as possible (it might, perhaps in some cases, be advantageously cast in one piece), and is fixed at right angles to and concentric with a long, hollow conical axis. This axis rests and turns in two collars, one towards each end of the cone, fixed at the front and back of a stone pier, three or four feet in depth, and there are four screws at the back for adjusting the horizontal axis in inclination or azimuth. The circle is divided on its edge to 5′, upon a narrow ring of gold or other metal let into the rim; the divisions are read by the six micrometer-microscopes at A, B; C, D; E, F. The telescope is fixed at right angles upon an axis which works within the hollow conical axis of the circle, and can be moved upon the circle into any position; it is held fast by clamps towards the object and eye-end. At the eye-end there are three or more vertical, and one horizontal wire, and a micrometer, which carries a second horizontal wire parallel to the fixed wire. To prevent wear, and to give ease and smoothness to the motion of the circle, two large friction wheels are suspended in front of the pier from the arms of two levers, which by counterpoises may be made to support the whole or part of the weight of the instrument. They press upwards upon a ring on the axis, between the circle itself and the pier. There are several small contrivances which need not here be mentioned, as our design is only to give an idea of the nature of the instrument. For a more minute description the reader must consult *Pearson's Astronomy*, vol. ii., pp. 472, 488, plate xx. The above description belongs to the mural circle as constructed by Troughton. In one or two later instances the collars have been exchanged for Y's, that is, angular notches in pieces of metal, in the hope of making the instrument serve for a transit; but this has not, we believe, yet been performed satisfactorily. Dr. Robinson, in the circle made for the observatory at Armagh, preferred having the divisions cut on the back of the instrument, and the microscopes fixed on the edge of a circular pier, with several other alterations (for which see *Mem. Ast. Soc.*, vol. ix.) The divisions of the circle are cut by Troughton's method. [See GRADUATION.]

After the instrument is erected on its pier, the axis must be placed horizontally, or the plane of the circle vertical. This may be done by a plumb-line apparatus, which generally accompanies the instrument; or more accurately by making a star pass the meridian wire at the same time when seen directly, and also when seen reflected in a trough filled with mercury or water, &c. The four screws at the back of the pier supply the means of effecting this. The second adjustment, or placing the line of sight at right angles to the axis, may be performed by two distant marks to the north or south of the circle, which have been previously correctly placed by means of a transit; or by a collimating transit [COLLIMATOR]; and finally, the instrument may be placed in the meridian, either by a mark, or by observations of circumpolar stars above and below pole, or by observations of high and low stars, just as a transit. [TRANSIT.] Or the position of the plane described by the line of sight with respect to the meridian, may be determined by comparing the passages of stars over the meridian, as observed with the circle and with the transit at the same time: when the law of the errors being known, and also the amount of their sum, their respective values are easily ascertained and corrected. It may, however, be remarked, that small errors in any or all these adjustments will not vitiate the results and that the moon is the only celestial body sensibly affected by ordinary variations from the true meridian.

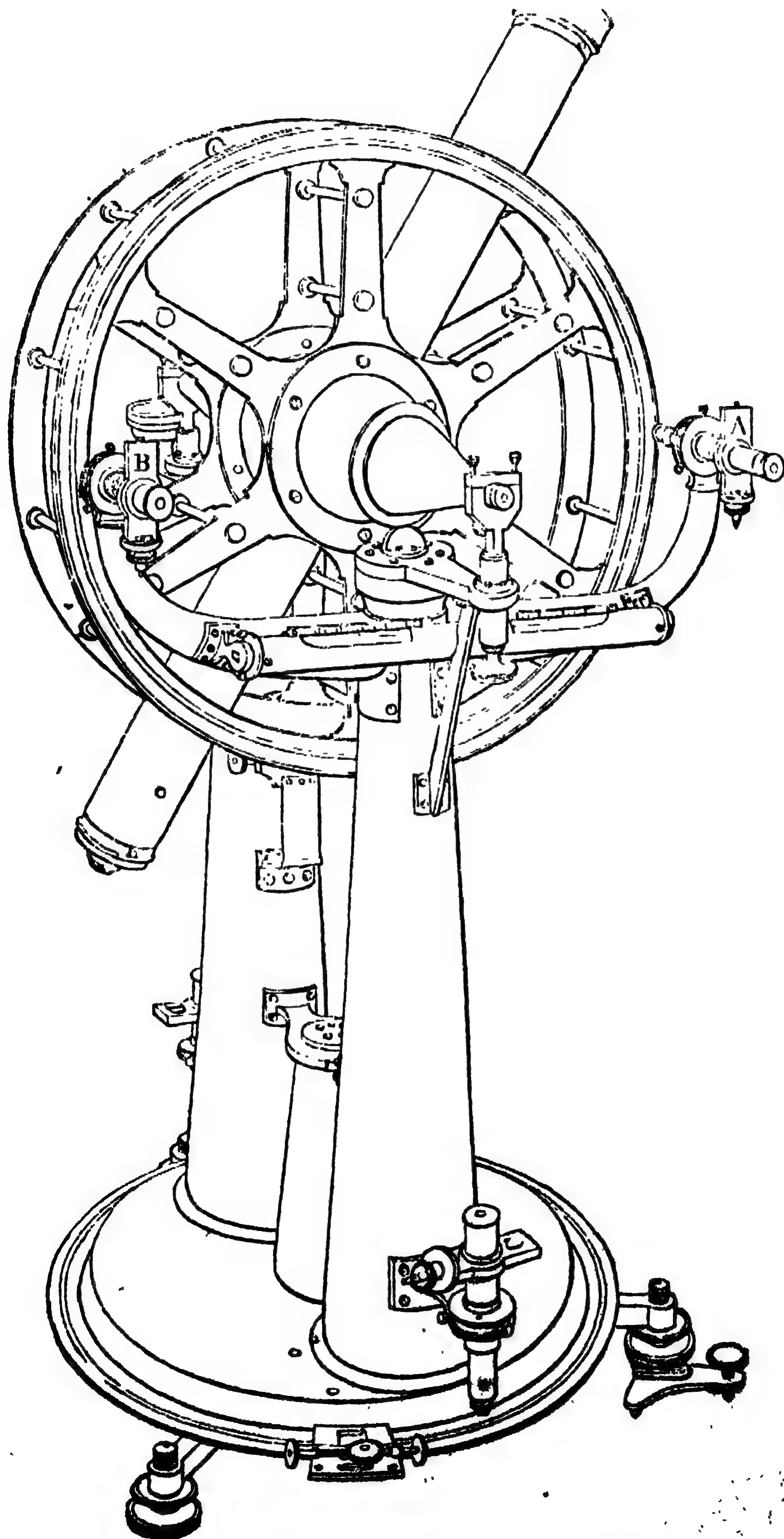
The mural circle is used in measuring angular distances

on the meridian, and the observation is performed thus:—The telescope is pointed nearly in the direction of the object, and the circle fixed by the clamp in that position: then the instrument is moved by the slow motion-screw of the clamp, until the horizontal wire exactly cuts the star in two, or *bisects* it, at or near the meridian wire. If the object be the sun or moon, or a planet having a considerable disc, the wire is made a tangent to its illuminated edge. With the sun, a dark glass is put on the eye-end to protect the sight, and at night a lamp placed opposite the centre of the telescope throws light through a glazed aperture, which is again reflected by a polished metal ring placed at an angle of 45° with the axis of the telescope, so as to illuminate the field of view and show the wire distinctly. This light can be modified at the pleasure of the observer, and the apparatus for this purpose is shown on the telescope. The mural circle has been used somewhat differently by different observers. When Troughton proposed a mural circle for Greenwich, he said that all observations should be considered as distances from the pole; and that the place of the pole on the instrument (*i. e.* the reading of the circle when the telescope points to the pole) should be determined from the successive upper and lower culminations of Polaris, and other close circumpolar stars. The north polar distances of stars might thus be measured and registered with the help of a correct table of refraction, without an accurate knowledge of the latitude of the place, which is only wanted for converting polar distances into altitudes or zenith distances, for computing refraction and parallax. The latitude of the observatory might be subsequently deduced by comparing the polar distances of stars near the zenith, for instance, of γ Draconis at Greenwich, with the zenith distance of the same star observed by the zenith sector or the zenith tube. [ZENITH SECTOR.] The observations could be checked by combining them with observations by reflection, when the star is seen reflected from the surface of a trough of quicksilver. In a climate so variable as that of England, Mr. Pond, then astronomer royal, found it advisable to modify the plan thus suggested. He first formed an approximate catalogue of the north polar distances of several stars by these or other means, which he perfected as follows:—Assuming the approximate catalogue to be correct, every future observed place, compared with the place computed from the catalogue, presented a difference, which he called the *index error* of the instrument, and from the observations of several stars he obtained a *mean* index error. This mean index error was then applied to each of the observations, and a corrected catalogue thus produced, which by repeating the process leaves no constant error except such as may be common to all the stars employed; such, for instance, as an original error in assuming all the polar distances too large or too small. Now an error of this nature affects all stars at their superior passage alike, and makes them all equally appear too near to or too far from the pole; but it affects the superior and inferior passages of the circumpolar stars by equal and contrary quantities. Hence the difference between the mean of two sets of observations of Polaris and other circumpolar stars, one set being deduced solely from upper, and the other solely from lower culminations, is clearly equal to twice the mean error in the assumed place of the pole with respect to the stars; and this correction being applied to all the stars, a new and more correct standard catalogue was formed, to be again corrected and improved by future observations. It is evident that the errors of the originally assumed catalogue are now wholly eliminated. By shifting the place of the telescope on the instrument, fresh divisions were brought into use for each star. The accuracy of the tables of refraction employed might have been tested by the agreement of near and distant circumpolar stars, in assigning the same value for this correction to the polar point. The only defect in this method seems to be, that it assumes the accuracy of the instrument or the accuracy of the tables of refraction; and that if either or both be imperfect, the final results are not in a form suited to investigation.

Another mode was adopted by Mr. Pond after 1824, when a second mural circle, made by Mr. T. Jones, of Charing Cross, was erected at Greenwich. Suppose several stars to be observed the same evening in two groups, which call A and B. All the stars in group A are observed by both circles by direct vision; the stars of group B are observed directly by one circle, suppose Jones, and by reflection, by Troughton. Let the mean of the readings of group A, by Jones, exceed the mean of the readings of the same group by Troughton, by m''; then it is clear, the instruments continuing in the same state, that if from the observation of any other star, by Jones, you *subtract* m'', you will have the reading which Troughton would have shown, barring accidental errors, and *vice versâ*, that on *adding* m'' to any observation by Troughton, you will get the corresponding observation, with the same exceptions, which would have been made by Jones. Again, let a star in group B be taken, and let D be the angle read off by Jones, the star being then seen directly, and R the angle by Troughton, the star being seen by reflection. Then according to what has been said above, $D - m''$ is the angle which Troughton would have given by direct vision, and consequently the angle between the star seen directly and by reflection, which is twice the altitude of the star, $= R - D + m''$, or the altitude $= \frac{R - D}{2} + \frac{m''}{2}$. Again, as the reading which corresponds to the horizontal position of the telescope is evidently D + altitude of the star by Jones, and R — altitude or depression of the star by Troughton, we shall find for that reading, or the *horizontal point*, as it is called, in Jones, $\frac{R + D}{2} + \frac{m''}{2}$, and in Troughton, $\frac{R + D}{2} - \frac{m''}{2}$. In this way each of the stars in group B gives a fresh value for the horizontal point in each instrument, and the *mean* of the determinations for each circle is taken as the basis for reducing every observation by that circle. Thus the reading of each direct observation of the stars in group A with Troughton, being *subtracted* from the mean value of its horizontal point, will give the true altitude of the stars in group A, and the same value of the horizontal point being *subtracted* from every reflected observation of group B, by this circle, leaves in like manner the true altitude, which is all the astronomer demands from the circle. This method requires the groups A and B to be sufficiently numerous for eliminating the chance errors of mere observation, and to be distributed over various parts of the circle to destroy faults of form or of division. It is also supposed that the circles are instruments of nearly equal goodness, and that each is as perfect as art can make it. If they should be defective, the discrepancies in the partial determinations of the horizontal point will show it, and the astronomer must then attempt to discover the law and the cause of the defect. The combination of two circles to form, as it were, one instrument, has only been tried at Greenwich, but there it has proved eminently successful; Mr. Pond's opinion, after long experience, being, that *the pair were more than twice as powerful as a single one.* The same astronomer suggested an analogous method for one circle. Observe the groups A and B all *directly* one night, and on a following night observe A *directly*, and B by reflection. A comparison between the groups A on different nights (the change of place in the stars and in the refraction being allowed for) will give you the variation or change of place of the instrument and microscopes; and by applying this to the stars B, observed on either of the nights, you will have observations of the same stars on different nights, by direct and reflected vision, but with an *unchanged* instrument. Hence the double altitudes of B are found, and also the horizontal point for one of the nights which when increased or diminished by the variation above found, is the horizontal point for the other. This method, or one similar to it, is, we believe, followed at Edinburgh and the Cape of Good Hope; and it is found that these instruments are so steady and unfluctuating, that the same value of the horizontal point results from the observations of several days. In this system the observations of one day are made dependent on those of another, when the atmospheric circumstances may be widely different. It has, however, one advantage over the previous method with two circles, that it places more directly in evidence the individual errors of the instrument. The differences which may be found between the partial determinations of the horizontal point on the same night, and on different sides of the zenith, will show what reliance is to be placed on it and on the observer.

When the mural circle was erected at Cambridge, Professor Airy selected the following plan of determining the horizontal or zenith point. The micrometer attached

to the eye-end of the telescope has already been mentioned. The value of a revolution of this micrometer having been very exactly measured, and the parallelism of its movable wire with the horizontal wire carefully ascertained, and also the reading of the divided head when the two wires coincide, the telescope is set pretty nearly in the position at which a star by *reflection* would be on the horizontal wire, the circle is then firmly clamped, and the microscopes are read off. When the star is at a convenient distance from the meridian wire, it is bisected by the micrometer wire without stirring the circle. When this is done, and the time noted, the circle is unclamped, and the star bisected by *direct vision* on the fixed horizontal wire, by turning the whole circle round, and the time is again noted. If the star had been observed in both instances upon the meridian and upon the fixed wire, it is clear that the reading corresponding to the horizontal position of the telescope would be half way between the readings of elevation and depression, or $= \frac{R + D}{2}$. The correction to the meridian is easily found and applied, the times being known. Again, if the distance between the fixed and micrometer wire be equal to n'', it is clear that the reading of R is greater or less by n'' than it would have been if the observation had been made with the fixed wire, and that the further correction for the micrometer is made simply by the addition or subtraction of $\frac{n'}{2}$ to the value already found of the horizontal point. In the Cambridge Observations, Professor Airy tabulated the reading corresponding to the zenith position of the telescope. From a mean



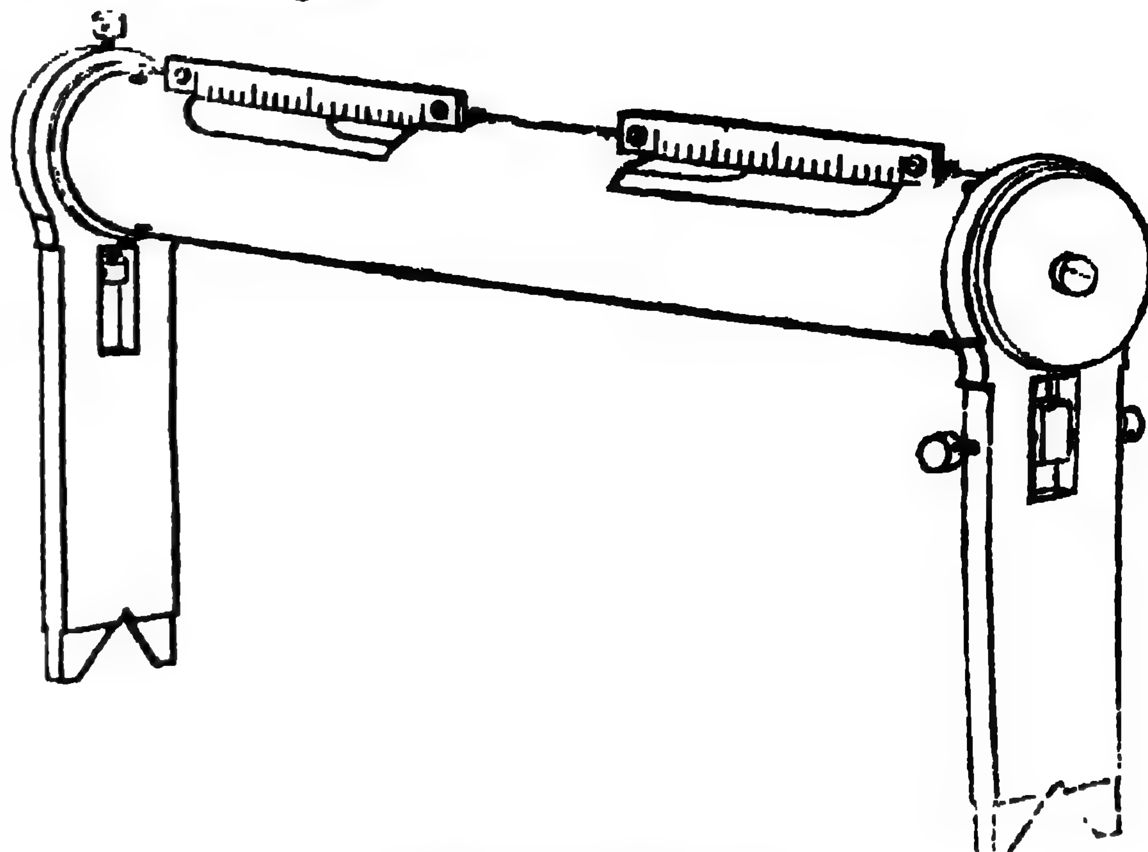
Eighteen-inch Altitude and Azimuth Circle, by Troughton and Simms. 1836.

of such determinations the reading of the zenith point is settled, and all observations made in the ordinary way, reduced to altitudes or zenith distances. For this mode of observing, the micrometer should be exquisitely perfect, and carefully watched. On comparing the zenith points deduced from low and high stars, to the north and south of the zenith, Professor Airy discovered some anomalies, the causes of which have not yet been fully ascertained. (*Cambridge Observations*, 1833, p. 27.) They seem, however, to exist in other mural circles, and possibly in circles of a different construction.

The micrometer microscopes, in what has been said, are supposed to be exactly adjusted, so that five revolutions of the screw carry the cross of the wires precisely over a space of 5′ on the circle. It is not possible to make this adjustment with perfect accuracy, nor would it be permanent; but it is not necessary. By examining the value of the *runs*, as they are called, *i. e.*, the measures in revolutions and parts of the screw of the 5′ spaces in the circle, a mean value of the measure of 5′ by the six microscopes is obtained, from time to time, which may be a little greater or less than five revolutions. In this case, the mean of the micrometer readings, *i. e.*, of the single minutes and parts, must in each observation be altered in the proportion of the value thus ascertained to 5′. If, for instance, the mean value of the 5′ spaces on the circle were apparently 5′ 5″.1 by the microscopes, $\frac{1}{60}$ must be subtracted from the minutes and seconds indicated by the mean of the microscopes. For actual adjustment, the following directions may be useful. A micrometer microscope is adjusted when the image of the divisions of the circle is formed upon the cross wires of the microscopes, and its size is exactly equal to five revolutions of the screw. Suppose the vision of the wires and of the divisions to be perfect, but that the space of 5′ is passed over by four revolutions and fifty parts of the screw. It is evident that the image is too small, and it must be made larger by drawing out by the screw the object glass G, and bringing it nearer the limb. In this case however the image is formed between the wires and the eye-piece, and therefore the whole body of the microscope must be drawn from the circle until the image falls on the cross wires. It will now be found that the image of 5′ is larger than before, and it must be again measured by the screw. In this way by gradual attempts the microscope may be perfectly adjusted, but the operation, if complete accuracy be aimed at, is very fatiguing and troublesome.

The general form of the altitude and azimuth circle will be seen from the woodcut. The lower, horizontal, or azimuth circle, is fixed on three strong radii which have foot screws at their extremities, and a strong vertical steel axis rising from their intersection. On this axis the whole of the upper works move freely and smoothly on a conical cap accurately fitted and ground to the top and bottom of the axis. On the lower part of the cap is fixed a broad circular plate on which the two pillars rest which support the circle and telescope. The microscopes for reading the azimuth circle are fixed on the pillars. Outriggers stand on the top of pillars, each of which carries a notch or Y, which can be raised or depressed by a screw. The vertical, altitude or declination circle is framed with a view to strength and lightness, and its divided face is read by two microscopes placed on the end of the curved tube, which is formed something like a pair of horns, and fixed across the top of one of the pillars. The circles are usually divided to 5′, and subdivided by the micrometer microscopes to seconds. The graduation of the horizontal circle generally runs from 0° to 360°, the vertical circle is differently divided according to the pleasure of the artist or observer. A little consideration will enable any one to apply the rules given for reading microscopes to each particular case. We shall speak indifferently of altitudes and zenith distances, since they are immediately derivable one from the other. The wires of the telescope are illuminated by a lamp which shines in at one end of the cross or transit axis of the vertical circle, and is reflected on the wires by a pierced polished ring set diagonally. There are two sensible ground levels, one of which is attached to the horns supporting the upper microscopes; another, which is free, can be applied through the openings of the circle to the pivots of the cross axis. This cross level and its adjusting screws will be understood by the accompanying figure.

There are clamps and slow moving screws to each circle to fix them, and to give the power of bisecting any object with the telescope.



[Detached or Transit Level.]

The first adjustment is that of setting the vertical axis perpendicular to the horizon. Turn the instrument until the fixed level is nearly parallel to two of the foot-screws, and place the bubble in the middle by the foot-screws. Then moving the instrument half round in azimuth, bring the bubble again to the middle; half by the foot-screws, and the other half by the screws which raise or depress one end of the level. If this is carefully done, and the circle restored to its original position, the bubble will be still in the middle, but if not, it must be brought there, half by the foot-screws, and the rest by the level-screw. Now, turning the instrument a quarter round, through 90°, bring the bubble into the middle of the scale by touching the third foot-screw. This is generally placed in front and towards the observer, and rests on a small lever apparatus, represented in the figure, which supplies a very delicate slow motion, contrived, we believe, by Borda. When the operation is successfully performed, the bubble will remain in the centre, whatever azimuth the instrument is directed to. It is not necessary in practice to touch the screw which adjusts the level if the error be very small. The divisions of the level scale corresponding to both ends of the bubble should be noted before and after reversion, and the mean taken. Let the foot-screws be called E and W, and the ends of the level towards them be distinguished by the same letters, and the scale of the level be numbered from the centre to each end, and suppose the readings be

	E	W
In the first position .	67″.4	48″.2
In the reversed position	59″.6	56″.0
Mean. .	63 . 5	52 .1 difference = 11″.4.

The mean readings would have been the readings of the level, if the level itself had been in adjustment. It is evident that E is too high, or W too low, by half the difference, or by 5″.7, and one of the foot-screws must be turned enough to shift the bubble 5″.7 in the right direction. Troughton always moved both E and W an equal quantity in contrary directions for this adjustment, which in many cases is very much better. If that is carefully done, the E readings will be diminished, and the W readings increased by 5″.7, and they will stand thus:—

	E	W
In the first position . .	61.7	53.9
In the reversed position	53.9	61.7

or the bubble keeps the same position *in its scale* before and after reversing, and the axis is vertical to the line joining the two foot-screws. The bubble must be placed at the same divisions when over the third foot-screw, and the axis is truly vertical. The difference between the last-mentioned readings is 7″.8, and the half of this, or 3″.9, is the quantity through which the bubble should be moved by the level screw to complete its adjustment, if that be desired; but if the true value of the divisions of the scale be known, and it is also known that this does not sensibly vary with the temperature or from other causes, it is useless to adjust very scrupulously, since the ends of the level must always be read and noted, and the difference allowed for by a careful observer. In some larger instruments of this construction, the vertical axis is adjusted by a plumb line, which

Ramsden and Troughton applied in different ways. One of these applications will be described under ZENITH SECTOR; but we are inclined to think that the ground level is more accurate, while it is incomparably more convenient than the plumb line, for small circles, which move freely in azimuth, and are used agreeably to their construction. The vertical axis being properly placed, the cross axis of the upper circle is next to be set horizontal. Pass the detached level carefully through the openings in the circle, place its notches on the pivots of the axis, note the ends of the bubble, exactly as before, reverse the level and note the ends again. Suppose the results to be,

	East End.	West End.
First position . .	6.24	8.43
Reversed position .	7.96	6.71
Mean . .	7.10	7.57

hence the difference between the mean readings is 0.47, or the west end is higher than the east by 0.235. The bubble must be moved this quantity towards the east by raising the east, or depressing the west pivot. There is a screw under each pivot for that purpose. It is convenient to have the scale divided into parts, of which the units are 15″ of a degree.

The microscopes should be adjusted, if that be required, in the manner already described, but we recommend amateur observers, at least, to have the body of the microscopes made unalterable, after the maker has settled both the adjustments, by pinning together the body and tube which carries the object-glass. Both adjustments will then be performed by making the 5′ spaces equal to five revolutions of the micrometer screw, simply by shifting the body of the microscope a little nearer to or farther from the instrument. This should be done pretty carefully, but any remaining error may be corrected as in the mural circle. The microscopes (there are generally a pair to each circle) are finally to be placed in a diameter of their respective circles, and nearly in the middle of the concentric lines, which contain the divisions. There are screws in the tubes by which the microscopes are mounted, which allow them a little motion in any direction, and the cross wires are thus brought to bisect divisions 180° apart. This requires no particular exactness, and may be done at once for the azimuth circle. The upper microscopes may be adjusted approximately. The optical part of the instrument must now be put into order. At the eye-end of the telescope there are generally five or seven vertical and three or five horizontal wires, *i.e.* fine lines of cobweb, raw silk, or any very delicate and uniform fibre. To place these in the focus of the object-glass, apply the highest magnifying power you have got, bring the wires to distinct vision, and look at a bright star. The wires and eye-piece are fixed on a piece of tube which moves stiffly within the tube of the telescope, and this must be pushed in or drawn out till the star is seen perfectly round and surrounded with rings, the wires being at the same time sharply defined. This adjustment may be completed or verified thus:—The pole star, or any circumpolar star, may be bisected by the vertical wire when near its greatest elongation, or by the horizontal wire when near the meridian. In the former case the eye is to be moved on each side, in the latter up and down; and if the star continues bisected, and there is no dancing of the star on one side or other of the wire, the position is correct. When the star moves contrariwise to the eye of the observer, the tube must be pulled out, as the image of the star is then formed between the wires and the eye, and the wires must be brought to the same place. When they move the same way, the tube is to be pushed in, until the image is formed exactly upon the wire. Any error must be corrected by gradually pushing the tube in or out. When this has been once successfully done, a notch for verification should be made to save all future trouble. The vertical wires are now to be set at right angles to the axis. Take any well-defined object, either a sharp distant terrestrial mark, or the wires of a subsidiary telescope [COLLIMATOR], or a circumpolar star at its greatest elongation. Bisect this at the centre of the middle wire, and move the telescope up and down until you see the object at the top and bottom of the field. If it is not bisected there, twist the movable tube round, and so bisect it, and repeat the operation until you are satisfied. The middle horizontal wire, if a correct position of that is preferred, must be adjusted, by twisting the tube until a star on the meridian runs along the horizontal wire by its own motion, the azimuth circle being fixed; or by moving the instrument in azimuth after having bisected Polaris or a circumpolar star near the meridian, on that wire. There are screws above and below the tube at the eye end, which should now be tightened. To make the central and vertical wire describe a great circle, bisect a well-defined object, as near the horizon as may be, read the horizontal microscopes, turn the instrument 180° in azimuth, and observe again, reading the same microscopes. If the means of each pair of readings, before and after reversion, differ *exactly* 180°, the wire describes a great circle; if not, move the instrument half way to 180° by the clamp screw, and bisect the object by turning two antagonist and pulling-screws near the eye-piece, which draw the wire plate to either side; repeat the operation until you are satisfied. If the horizontal clamp is strong enough, the circle may be taken out of its axis and reversed as an ordinary transit [TRANSIT]. The upper microscopes may now be correctly adjusted. Observe any object which does not alter its altitude on the middle horizontal wire, and read the upper microscopes; turn the instrument through 180° of azimuth, and observe the object again. Move the circle to exactly the middle of these two readings (which will be near either 0° or 90°), when the telescope is in the zenith, and then by the adjusting screws set the crosses of each of the microscopes exactly on 0° or 90°, as the case may be; the microscopes are then in a diameter, and the error of collimation in altitude is also destroyed. As this correction is altered by any alteration of the apparatus for levelling the horizontal axis, and as few observers like to meddle with the adjustments of their microscopes, the microscopes can be brought into a diameter after the axis is made horizontal by raising or lowering each of the levelling screws a small equal quantity; but though it is convenient that the microscopes should read nearly the same angle, it is not at all essential to accuracy, and the error of collimation must always be ascertained or eliminated by the mode of observation.

We shall always suppose every observation to be a *mean* of two, one made face east and the other face west, unless the contrary be said or implied. In this case there is no error of collimation.

The altitude and azimuth circle was, as has been stated, invented by Roëmer, though a quadrant moving freely in azimuth, and with a graduated horizontal circle, was used by Hevelius. It is the most universally useful of all astronomical instruments, and is both portable and accurate. In delicate hands, and with some power of calculation, it is capable of performing a great deal of good work. Besides being an excellent geodesical instrument [THEODOLET], it is, when placed in the meridian, an accurate, though not very convenient transit. It may be used in this position as a meridian or transit circle, for determining at once the right ascension and zenith distance of any unknown stars. In this case the horizontal point must be got by combining observations taken directly with others by reflection, in the manner already described in the mural circle; or else several standard stars may be observed, and their instrumental places compared with their computed places; the mean of these differences is to be applied as an index error to correct the observations of unknown stars exactly as in Mr. Pond's first method with the mural circle. In this mode of observing there is no reversion.

The principal merit in the altitude and azimuth circle is, that it can be moved in azimuth without injuring its accuracy as a measurer of zenith distance. Let us suppose a navigator in a strange place with such an instrument and a time-keeper, of which the error is unknown. This should mark sidereal time. The instrument must first be nearly adjusted, and the approximate meridian selected. This will be known near enough by shifting the instrument in azimuth till it is found that a star, which is bisected by the horizontal wire, continues to be bisected for a short time. Observe the zenith distance of some known star in this direction, and this will give an approximate latitude. The time and the azimuth of the star should also be noted. Now observe the zenith distance of another known star near the prime vertical, the time deduced from this and the approximate latitude will be a very close approach to the true sidereal time at the place. The original latitude from the first observation may now be corrected by a more accurate knowledge of the time, and the azimuth of the star at the time of observation be deduced, whence the reading correspond-

ing to the meridian position of the instrument is also known. If these observations have been managed with any skill or discretion, the latitude and time are now found near enough for future calculations *.

To ascertain the latitude with the utmost precision, several standard stars are to be observed near the meridian, and, if it may be, at pretty nearly equal distances from the zenith, north and south, to 70° or 80° zenith distance. A few minutes before the star comes to the meridian, bisect it near the centre of the middle horizontal wire, noting the time of bisection. It is perhaps more exact to place the wire close to the star, and then, leaving the vertical circle untouched, to move the whole instrument by the horizontal clamp along with the star until it is bisected upon the wire by its own motion. The ends of the level and the upper microscopes are then read, the instrument is turned gently round 180° in azimuth, and the observation is repeated. The sum of the two angles (when each pair of readings is connected into one zenith distance) is twice the apparent meridian zenith distance of the star, affected by the want of verticality in the axis, which is known from the level, and by a small correction depending on the time of observation. It is clear that if the end of the level towards the eye end of the telescope is too high, that the foot-screw towards the observer should be lowered, in which case the telescope would point above the star, that is, show a less zenith distance than the true zenith distance. Hence the rule is, take the reading of the end of the level towards the object end of the telescope from the reading towards the eye end, halve the difference, and add this, when converted into arc, to the instrumental zenith distance. This may be done in each case, or the mean of the whole applied to the mean of the instrumental zenith distances. For the *correction to the meridian* the formula is,

$$\text{Corr.} = \frac{\text{cos. dec.} * \times \text{cos. lat.}}{\text{sin. zen. dist.} *} \times \frac{2\ \text{sin.}^2 \tfrac{1}{2}\ \text{angle at the Pole}}{\text{sin. } 1''}$$

The first factor must be computed for each star, the latter is taken from a table which may be found in *Schumacher's Hülfstafeln*, or *Baily's Tables*, and in many collections of astronomical tables. The argument is the angle at the pole, that is, the difference between the moment of observation and the transit of the star. This correction is to be *subtracted* from the zenith distance of stars observed *above* the pole, and *added* to those observed *below* the pole. The mode of observing is generally known by the name of *circum-meridian*. We have here detailed the process as it refers to a single pair of observations, but several pairs may be taken, as many as can without hurry be got in a quarter of an hour on each side the meridian. With a good instrument and a careful observer, the latitude thus deduced from several stars will be very near the truth, if the observer employs a correct catalogue, such, for instance, as that of 1112 northern stars, published by Mr. Pond in 1833, or the catalogue of southern stars, by Lieut. Johnson, 1835: if he can observe the same circumpolar stars at their upper and lower culminations, he may obtain a latitude independently of any catalogue. If stars near the pole be observed, it is not necessary that they should be near the time of passing the meridian, but the reduction to the meridian zenith distance must be computed by an exact formula. There are special tables of Polaris for this purpose in the *Nautical Almanac*.

The time may be found by two or three methods. The zenith distances of known stars near the prime vertical, both to the east and west, may be observed, and the horary angle computed from the observed zenith distance and the known colatitude already found. In this case the altitude circle should be kept clamped, while the times of the passage of the star over each of the horizontal wires are noted, the mean is to be taken, and the instrumental zenith distance is to be corrected for the indication of the fixed level. Repeat the operation after reversing the instrument, and take the mean of the zenith distances, which will correspond very nearly with the middle time between the observations. From this zenith distance the error of the time-keeper is found. The mean of the errors deduced from an equal number of stars on the east and on the west prime vertical will be very nearly correct, and depend upon the divisions of the circle and the catalogue employed. Also the altitude circle being clamped, a star may be observed rising near the east prime vertical, and again, by moving the instrument in azimuth, near the west prime vertical when descending. The middle time will be the meridian passage of the star by the time-keeper, which, when compared with the computed right ascension, will show the error of the time-keeper. This method (commonly called that of *equal altitudes*) is not to be recommended, except for stars near the zenith, which pass quickly from one prime vertical to the other. The changes of the level, of the instrument, or of the time-keeper, may occasion greater errors than can well arise from the divisions of the circle, not to mention the greater length of time occupied by the observation and the chance of disappointment from change of weather. Lastly, the time may be derived from this instrument, when the lower circle is clamped, and the telescope is made to move in the meridian like a transit. The transit will be explained hereafter, but the adjustment to the meridian is greatly facilitated in this instrument by the divided horizontal circle. Either the azimuths of a star may be observed when it has the same altitude on the east and west of the meridian, in which case the middle reading of the azimuths will be the reading corresponding to the meridian; or the time may be got very nearly from a star near the zenith, and then the error of the time-keeper being known, Polaris or any near circumpolar star may be bisected, by moving the instrument in azimuth, at the time when, by the clock, it should be on the meridian; or Polaris, or any known circumpolar star, may be observed at its greatest elongation, when its azimuth is known by computation; or, generally, a known circumpolar star may be observed anywhere, and its azimuth be computed for the *known* time of the observation, when the instrument can be shifted this quantity. For the mode of correcting errors of level, &c., and of deducing the longitude from the passage of the moon over the meridian, &c., see TRANSIT.

When the direction of the meridian is required with great accuracy, the process used in the *Trigonometrical Survey*, vol. i., p. 242, may be followed. The azimuth of Polaris was observed when at its greatest elongation to the east and to the west of the meridian, and the mean of these was taken for the reading of the north point. The cross level should be applied to the transit axis and the error carefully noted before every observation, and the instrument should be reversed once at least during the series.

Little has been said of the *error of collimation in altitude*, because in truth the determination of this error is scarcely ever required in a separate shape by an accurate observer. It may, however, be determined thus. Observe a star with the divided face of the circle to the east, and then with face west, near the meridian, exactly as has been already described, correct each zenith distance to the meridian and for the indication of the fixed level. Then the difference between these zenith distances, if any, shows that the microscopes do not read 0°, when the telescope is in the zenith and the vertical axis is correct: half the difference is to be added to all observations made with the instrument when the face is one way, and to be subtracted from all observations when the face is the other way, as the case may be.

If an observer should wish to use an instrument of this kind for making a catalogue of unknown stars, he may place it accurately in the meridian, and observe transits and zenith distances at once, using an index error for the latter deduced from known or standard stars, as we have described above. Or the zenith distances may be determined by *circum-meridian* observations, which is perhaps a more accurate and certainly a more independent mode. The peculiar advantage of the altitude and azimuth circle is however for observing phenomena when out of the meridian, and therefore not within the reach of the principal instruments: for instance, in determining the place of a comet, &c. Here the time must be noted when the object is bisected by the crossing of the horizontal and vertical wires, and the upper and lower microscopes and fixed level read off. The instrument is now to be reversed and the operation repeated. Then if the object is not near the meridian and the interval is short, the mean of the zenith distances and the mean of the azimuthal readings

* Let S be the first star observed near the meridian, and σ the second near the prime vertical, P the pole, and Z the zenith; then PZ the colatitude = PS − ZS nearly. Again, the triangle PZσ being solved with this approximate value of PZ will give the angle σPZ, which, if the star is west, being added to, or if east, being subtracted from its right ascension computed from the catalogued place, gives the true sidereal time at the place of observation, and hence the error and correction of the time-keeper. Let this correction be applied to the time of observing S, then the difference between the time so corrected and the computed right ascension of S gives the ∠ SPZ, from which the correction of ZS to the meridian may be deduced.

correspond very nearly to the middle time, and as the azimuthal reading of the meridian is, or easily may be known, the azimuth and zenith distance of the object at a *given* time are known, which, with the colatitude, are two sides, and the included angle of the triangle Z P S, which can therefore be solved, and the polar distance P S, and the horary angle Z P S be found. If the observations should be made near the meridian, the corrections as found in circum-meridian observations must be applied.

The observer, who is not afraid of working spherical trigonometry, will find the following a very exact method of ascertaining the place of a comet or planet. Observe the altitude and azimuth, noting the time, of a known star, as near the comet as may be, and then the altitude and azimuth, also noting the time, of the comet. The *computed* altitude and azimuth of the star, when compared with that *observed*, will give an index error for the instrument, in altitude and in azimuth; which, when applied to the observed places of the comet, afford correct data for computing its horary angle and polar distance. This method is only an application of the principle of measuring differences, rather than absolute quantities, and admits of great exactness, even with an indifferent instrument, especially if several stars, on different sides of the comet, are used; but the labour is considerable.

An instrument of this kind will show very clearly the effects of refraction and parallax, though it cannot be expected to increase our knowledge on these points. On comparing the observed zenith distance with the zenith distance computed from the polar distance, and the horary or azimuthal angle, the difference will be the effect of refraction, or of refraction and parallax, as the case may be. The determination of the law and quantity of refraction was one of the purposes for which Piazzi's circle was principally designed.

The instrument-maker ought to mark the value of the parts on the scales of the levels, but it is advisable to ascertain these independently. Place the instrument so that the third foot-screw, that with the slow motion apparatus, is in the plane of the altitude circle, raise the foot-screw till the end of the bubble towards the observer is near the end of the scale, bisect a well-defined object with the telescope, and read the upper microscopes and the ends of the bubble. Then lower the foot-screw till the bubble is towards the other end of the scale, bisect the object again, and read off the microscopes (bringing the crosses to the same divisions) and bubble as before. You have thus a given number of parts of the scale, those through which the bubble has travelled, equal to the difference of the readings of the microscopes in the two positions, which is therefore known in seconds of space. This should be done several times and the temperature noted, as it will be found that not only the length of the bubble, but the value of the parts, varies with the temperature. A table may then be made for future use. By attaching the cross level to the altitude circle it may be examined in the same way.

There are several variations in the form of the altitude and azimuth circle. The vertical axis is sometimes depressed below the azimuth circle, which gives the instrument a greater compactness of form. In a few instances, instead of a pair of microscopes upon a fixed support, there are three or more which can be placed anywhere on the circumference of a ring, parallel to and concentric with the vertical circle. This is a very essential improvement, as besides getting rid of eccentricity, three microscopes at 120° distance, or a pair at right angles, destroy the effect of any change of figure corresponding to ellipticity. (See *Monthly Notices of the Astron. Soc.*, vol. ii., p. 96.) The errors of division may also be gradually eliminated by changing the positions of the readings. Three or more microscopes are sometimes applied to the horizontal circle.

The circle here drawn and described is divided by an engine; in instruments of higher pretensions one or both circles are divided by hand, generally according to Troughton's method. Sometimes both faces of the vertical circle are divided. There is a figure and description of a very beautiful circle, generally known by the name of the Westbury Circle, in a paper by Mr. Pond, *Phil. Trans.*, 1806, p. 420, plate xx., and of another in *Pearson's Astronomy*, vol. ii., p. 434, plate xix. A vertical circle, of eight feet diameter, moving freely in azimuth, planned by Ramsden and finished by Berge, is at the Observatory of Dublin, which, so far as we know, has not yet been described, though well known by the deductions of Dr. Brinkley. (See *Trans. Royal Irish Academy*, vol. xii., p. 33.)

The *transit circle* is very shortly described, as it is only the upper circle of the last-mentioned instrument, generally on a larger scale. This, when fixed in the plane of the meridian, may be used both as a transit and as a meridian circle at the same time. The supports should be of stone, to which the reading microscopes should also be attached. A very beautiful transit circle, of four feet diameter, and divided on both faces, was constructed by Mr. Troughton in 1804. This was for many years in the possession of the late Stephen Groombridge, Esq., of Blackheath, and was employed by him in forming a catalogue of stars within 50° of the north pole. It is described and engraved in *Pearson's Astronomy*, vol. ii., p. 402, plate xvii. The artist himself was dissatisfied with the weakness of the axis, a capital fault in an instrument for observing transits, and we conceive that there was a still greater oversight, though one more easily repaired, in the unsteady fixing of the reading microscopes, which are mounted on slender bars of brass instead of stout stone crosses; the consequence was, that the index error was always changing. The meridian circle of Roemer, and those which resemble it, have been already mentioned. This form is perhaps preferable to that of Groombridge's, the axis being less subject to flexure; but its unsymmetrical appearance is disagreeable, and makes some of the ordinary modes of adjustment impracticable. The unequal bearing on the pivots may also require caution. The meridian circle of Reichenbach is like the ordinary transit telescope, with the circle and verniers close to one of the pivots. It is too complicated to be described in a few words, and is not, we believe, to be met with in this country; but most of the continental observatories east of the Rhine are furnished with them. In the hands of Bessel, Gauss, &c., the circle of Reichenbach is undoubtedly a very powerful and accurate instrument, but we think not so perfect, certainly not so fit for ordinary observers, as a closer copy of Röemer's would be, while it is much less simple, and the telescope is more liable to injurious flexure.

The adjustments of the transit circle are those of a mural circle and of a transit combined. A very ingeniously contrived plumb-line was applied to Groombridge's circle, to level the cross axis and adjust the collimation in altitude, but the methods already described were found to be more accurate and much less troublesome. Indeed the plumb-line apparatus of the mural circle is superseded by the use of observations by reflection.

Besides the works we have already referred to, the astronomical reader may consult, as to the mural circle, Pond's *Observations*, 1812, p. 236, and 1825 (where an example is fully worked out), for an account of his two methods, and his memoirs in the *Phil. Trans.* and *Memoirs of the Astronomical Society*; *Cambridge Observations*, vols. vi. and vii., and Johnson's *Catalogue of Southern Stars*, 1835. For the transit circle, Wollaston's *Fasciculus*, Preface and Appendix. For the altitude and azimuth circle, a Paper by Mr. Troughton, *Memoirs of the Astron. Society*, vol. i. p. 33; and generally the article *Circle* of the *Edinburgh Cyclopædia*, by Mr. Troughton, and Dr. Pearson's *Practical Astronomy*. On the mode of dividing circles and the errors to which their divisions are liable, see GRADUATION, and Troughton's *Memoir*, *Phil. Trans.*, 1809, p. 105; Dr. Robinson's Paper, already cited, and another by the same author, *Memoirs of the Irish Academy*, 1825; two Papers in the *Memoirs of the Astron. Society* on the *Errors of the Cape Circle*, one by Mr. Sheepshanks and Professor Airy, vol. v., p. 320; the other by Mr. Henderson, vol. viii., p. 141.

CIRCLE, MURAL. [CIRCLE, ASTRONOMICAL.]

CIRCLE, REFLECTING. [SEXTANT.]

CIRCLE, REPEATING. [REPEATING CIRCLE.]

CIRCLE, TRANSIT. [CIRCLE, ASTRONOMICAL.]

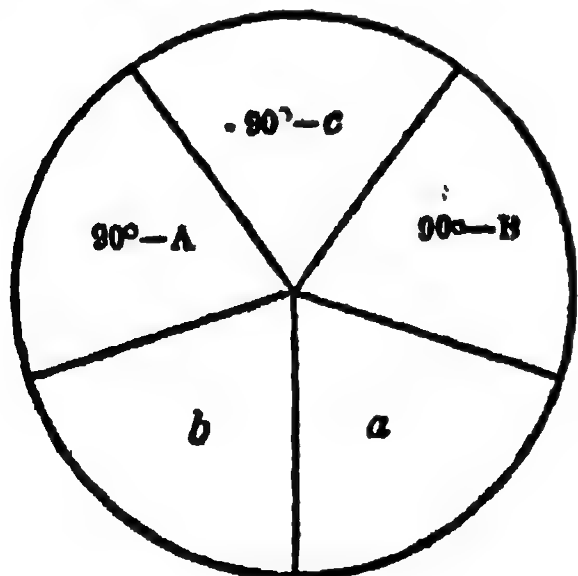
CIRCLE (QUADRATURE of the). [QUADRATURE.]

CIRCLES OF DECLINATION, ALTITUDE, &c. The use of these terms is not very well settled. According to some, a circle of declination would mean the parallel of any declination, or the small circle all whose points have the same declination; that is, a parallel to the equator. According to others, it would mean the circle on which declination is measured, that is, an *horary* circle passing through the poles. And the same of the other circles. Perhaps the latter sense is the more generally used; but in all cases the student must be aware of the difference when he consults a book on the doctrine of the sphere.

CIRCUITS, in English law, denote the periodical progresses of the judges of the superior courts of common law through the several counties of England and Wales, for the purpose of administering civil and criminal justice. The ordinary circuits take place in the spring and summer of each year; and for several years past one of the judges has made a circuit through the counties of Hertford, Essex, Kent, Sussex, and Surrey, in the month of December, for the trial of criminals. All the circuits take place under the authority of several commissions under the great seal, issued to the judges and others associated with them on each occasion. [Assize.] Most barristers practising in the common law courts in London are attached to one or other of the circuits; and each circuit is constantly attended by a numerous bar. The transaction of judicial business in the presence of a professional audience of this kind, has been justly considered as one of the best securities for the due administration of justice; and in consequence of the system of circuits, this advantage is not confined to the metropolis, but is communicated to the most remote parts of the kingdom.

Since the statute 11 Geo. IV., and 1 Will. IV. c. 70, by which the ancient system of Welsh judicature was abolished, the circuits of the judges are eight in number, and the counties of England and Wales are distributed among them in the following manner. The Northern Circuit comprehends the counties of York, Durham, Northumberland, Cumberland, Westmoreland, and Lancaster; the Western Circuit comprehends the counties of Southampton, Wilts, Dorset, Devon, Cornwall, and Somerset,—and Bristol; the Oxford Circuit comprehends the counties of Berks, Oxford, Worcester, Stafford, Salop, Hereford, Monmouth, and Gloucester; the Midland Circuit comprehends the counties of Northampton, Rutland, Lincoln, Nottingham, Derby, Leicester, and Warwick; the Home Circuit comprehends the counties of Hertford, Essex, Kent, Sussex, and Surrey; the Norfolk Circuit comprehends the counties of Buckingham, Bedford, Huntingdon, Cambridge with the Isle of Ely, Norfolk, and Suffolk; the South Wales Circuit comprehends the counties of Glamorgan, Carmarthen, Pembroke, Cardigan, Brecon, Radnor, and Chester; the North Wales Circuit comprehends the counties of Montgomery, Merioneth, Carnarvon, Anglesey, Denbigh, Flint, and Chester.

CIRCULAR PARTS (Napier's). A proposition which generalizes the relations between the parts of a spherical right-angled triangle into two only; first given (with a demonstration) by Napier in his 'Mirifici Logarithmorum Canonis Descriptio' (ch. iv., 1–8). It is as follows: Let a and b be the sides, c the hypothenuse, and A and B the angles opposite a and b, in a right-angled spherical triangle. Then take the complements of the hypothenuse and of the two angles, and the two sides, and write them in order in a perpetually recurring series, or round a circle, as follows:



Then taking any three parts, one may be made the *middle* part, and the other two either *adjacent* extremes, or *opposite* extremes. Thus 90°—B being the middle part, a and 90°—C are its adjacent extremes, and b and 90°—A its opposite extremes. Napier's rules are

1. Sine of *middle* = product of tangents of *adjacents*.
2. Sine of *middle* = product of cosines of *extremes*.

Thus sin. b = tan. a tan. (90°—A)
= cos. (90°—B) cos. (90°—c).

But we should strongly recommend the student to have nothing to do with this artificial memory, for it involves a process upon every occasion; and while one person is learning which are the parts which have complements taken, and the rules, another will master the six results, and will have no occasion for any future process. These results are

1. Cosine of hyp. = product of cosines of sides.
2. Cosine of hyp. = product of cotangents of angles.
3. Sine of *side* = sine of hyp. × sin. *opposite* angle.
4. Tang. of *side* = tang. of hyp. × cos. *adjacent* angle.
5. Tang. of *side* = tang. *opposite* angle × sine of other side.
6. Cos. of *angle* = cos. of *opposite* side × sin other angle.

These pairs present analogies which will help the memory, and we should recommend them in preference to the rules of circular parts.

CIRCULATING DECIMALS. When a common fraction cannot be expressed exactly as a decimal, the attempt leads to a never-ending series of figures, any number of which, with the decimal point properly placed, is an approximation to the common fraction, and the more near the greater the number of figures taken. Thus 1 with ciphers affixed and divided by 7, leads to the recurring or circulating series

142857142857142857......

and ·1428 is nearly $\frac{1}{7}$, but ·14285714 much more nearly. Hence it is said that $\frac{1}{7}$ is a circulating decimal whose period is 142857, and is denoted by $\cdot\dot{1}4285\dot{7}$. Similarly $\cdot 12\dot{9}$ denotes ·129999.... and $\cdot 05\dot{3}\dot{6}$ denotes ·053636.... As a part of practical arithmetic, the rules for converting these fractions into common fractions are useless, though found in most elementary works. One example will be sufficient here.

$\cdot 14\dot{3}6\dot{2}$ = ·14362362, &c. = $\cdot 14 + \frac{1}{100} \times \cdot 362362....$

If the circulating part continued *ad infinitum* be called S, it is plain that 1000 S = 362 + S, or $S = \frac{362}{999}$, whence

$$\cdot 14\dot{3}6\dot{2} = \frac{14}{100} + \frac{362}{99900} = \frac{14 \times 999 + 362}{99900},$$

Wallis (*Algebra*, ch. 89), Euler (*Algebra*, ch. 12, book i.), and John Bernoulli the second (*Mem. Acad. Sci.*, 1771), have treated this subject. We shall merely state some theorems to show the remarkable character of the periods

1. Form the period of a prime number m; its number of figures will be either $m-1$ or one of its divisors. The period of 7 (being 142857) has six figures; that of 13 (being 769230) has 6, the half of 13 – 1 figures.

2. When the period of a prime number m contains $m-1$ figures, the last half may be formed from the first by taking each figure in the first from 9. Thus the first and second halves of the period belonging to 47 are—

First half 02127659574468085106382
Second half 97872340425531914893617

3. When the period of a prime number m has $m-1$ figures, multiplication by any number under m only changes the order of the figures. Thus the period of 7 being 142857, we have here a number which, being multiplied by 2, becomes 285714; by 3, 428571; by 4, 571428; by 5, 714285; and by 6, 857142.

The following work may be useful to those who are curious on the subject: 'A Table of the Circles arising from the division of a Unit, or any other whole number, by all the integers from 1 to 1024, being all the pure decimal quotients that can arise from this source.' London, Richardson, 1823.

CIRCULATION OF THE BLOOD. The constitution of the blood, the nutrient fluid of the animal body, has been already described. Since the blood is necessary to nourish all the tissues of the body and to stimulate all its organs [Blood], it must be in motion in order to be borne to them. 'In man and in all the higher animals an apparatus is provided, partly for the purpose of originating an impelling force to put the blood in motion, and partly for the purpose of conveying the blood when put in motion to the different parts of the body.'

The organ that puts the blood in motion is the heart; the pipes or conduits which distribute the blood to the different parts of the body are the great vessels in connexion with the heart. The course of the circulation, which in all the higher animals is double—viz., one through the lungs, called therefore the *pulmonic*, or the *lesser circulation*; the other through the system, called therefore the *systemic*, or the *greater circulation*—cannot be understood until the structure and action of the heart have been explained.

[HEART, AND ITS GREAT VESSELS.] In the mean time it will be sufficient to state in this place the evidence that the blood is really in motion. The author of the 'Philosophy of Health' thus sums up the proofs that the blood is a flowing stream, and that it constantly pursues a regular and determinate course.

'1. With the microscope, in the transparent parts of animals, the blood can be seen in motion; and if its course be attentively observed, its route may be clearly traced.

'2. The membranes, termed valves, are so placed as to allow of the freest passage to the blood in the circle described; while they either altogether prevent, or exceedingly impede its movements in any other direction.

'3. The effect of a ligature placed around a vein and an artery, and of a puncture made above the ligature in the one vessel and below it in the other, demonstrates both the motion of the blood and the course of it. When a ligature is placed round a vein, that part of the vessel which is most distant from the heart becomes full and turgid, on account of the accumulation of blood in it; while the part of the vessel which is between the ligature and the heart becomes empty and flaccid, because it has carried on its contents to the heart and it can receive no fresh supply from the body. When, on the contrary, a ligature is placed round an artery, that portion of the vessel which lies between the ligature and the heart becomes full and turgid, and the other portion empty and flaccid. This can only be because the contents of the two vessels move in opposite directions—from the heart to the artery, from the artery to the vein, and from the vein to the heart. At the same time, if the vein be punctured above the ligature, there will be little or no loss of blood; while if it be punctured below the ligature, the blood will continue to flow until the loss of it occasions death; which could not be unless the blood were in motion, nor unless the direction of its course were from the artery to the vein, and from the vein to the heart.

'4. If fluids be injected into the veins or arteries, whether of the dead or the living body, they readily make their way and fill the vessels, if thrown in the direction stated to be the natural course of the circulation; but they are strongly resisted if forced in the opposite direction.'

The author concludes his account of the structure of the heart and blood vessels, and of the course which the stream of blood is ascertained constantly to pursue, with the following reflections:

'Such is the description, and, with the exception of the first proof, such the evidence of the circulation of the blood in the human body, pretty much as it was given by the discoverer of it, the illustrious Harvey. Before the time of Harvey, a vague and indistinct conception that the blood was not without motion in the body had been formed by several anatomists. It is analogous to the ordinary mode in which the human mind arrives at discovery (chap. iii., p. 103), that many minds should have an imperfect perception of an unknown truth before some one mind sees it in its completeness, and fully discloses it. Having about the year 1620 succeeded in completely tracing the circle in which the blood moves, and having at that time collected all the evidence of the fact, with a rare degree of philosophical forbearance, Harvey still spent no less than eight years in re-examining the subject and in maturing the proof of every point, before he ventured to speak of it in public. The brief tract which at length he published was written with extreme simplicity, clearness, and perspicuity, and has been justly characterized as one of the most admirable examples of a series of arguments deduced from observation and experiment that ever appeared on any subject.

'Contemporaries are seldom grateful to discoverers. More than one instance is on record, in which a man has injured his fortune and lost his happiness through the elucidation and establishment of a truth which has given him immortality. It may be that there are physical truths yet to be brought to light, to say nothing of new applications of old truths, which, if they could be announced and demonstrated to day, would be the ruin of the discoverer. It is certain that there are moral truths to be discovered, expounded, and enforced, which, if any man had now penetration enough to see them, and courage enough to express them, would cause him to be regarded by the present generation with horror and detestation. Perhaps during those eight years of re-examination the discoverer of the circulation sometimes endeavoured in imagination to trace the effect which the stupendous fact at the knowledge of which he had arrived would have on the progress of his favourite science; and, it may be, the hope and the expectation occasionally arose, that the inestimable benefit he was about to confer on his fellow-men would secure to him some portion of their esteem and confidence. What must have been his disappointment when he found, after the publication of his tract, that the little practice he had had as a physician by degrees fell off? He was too speculative, too theoretical, not practical. Such was the view taken even by his friends. His enemies saw in his tract nothing but indications of a presumptuous mind, that dared to call in question the revered authority of the antients; and some of them saw, moreover, indications of a malignant mind, that conceived and defended doctrines which, if not checked, would undermine the very foundations of morality and religion. When the evidence of the truth became irresistible, then these persons suddenly turned round and said that it was all known before, and that the sole merit of this vaunted discoverer consisted in having circulated the circulation. The pun was not fatal to the future fame of this truly great man, nor even to the gradual though slow return of the public confidence even during his own time, for he lived to attain the summit of reputation.'

In the seventh chapter of the *Philosophy of Health*, from which the above extract is taken, will be found a full account of the apparatus of the circulation, of the powers which move the blood, and of the uses which the circulation accomplishes in the living economy. [HEART, AND ITS GREAT VESSELS.]

CIRCUMCISION, the operation of cutting off the prepuce or foreskin, is sometimes performed for a medical purpose; but it is general or universal among some nations as a religious rite, and among others as a national custom. The practice of circumcision appears to be of the highest antiquity. Abraham, as recorded in *Genesis* (xvii. 10-15), by the command of God, circumcised himself and all the males of his household. Abraham himself was ninety-nine years old (*Gen.* xvii. 24) when he was circumcised. The rite of circumcision was ordained to be an everlasting covenant between God and the seed of Abraham; and it was declared that 'the uncircumcised man-child whose flesh of his foreskin is uncircumcised, that soul shall be cut off from his people; he hath broken my covenant.' All the males that left Egypt were circumcised, but during the forty years' wandering in the wilderness the rite was not performed. Joshua, by the express command of God, renewed it by circumcising all the males just after the passage of the Jordan. (*Joshua*, v.) Ever since the circumcision by Joshua, it has been universally observed, both among the Jews and the Ishmaelitish descendants of Abraham. Circumcision is not, properly speaking, a rite of the Mohammedan religion; it is not enjoined in the Koran, but the Arabs and Mohammed himself were circumcised before the religion of the Koran began to be preached, and their descendants have continued the usage as one which had always prevailed among them, and have also communicated it to the Saracens, the Turks, and the other nations who have become associated with them in a common faith. In point of fact, circumcision is as universal among the Mohammedans as it is among the Jews.

A great deal has been written, both on the ceremonial of the Jewish circumcision and on the question as to the sacramentary efficacy which has been sometimes attributed to the rite. On these matters the reader may consult Burder's 'Oriental Literature,' Calmet's 'Dictionary of the Bible,' Simon's 'Dictionary of the Bible,' and especially the able dissertation on circumcision in Michaelis's 'Commentaries on the Laws of Moses,' book iv., chap. iii., part i., articles 184—186, English translation by Dr. Smith, 4 vols. 8vo., 1814, and the authorities there referred to. Michaelis is decidedly of opinion that circumcision was never intended as a sacrament. Among the antient Jews, not only all proselytes were circumcised, but also all bondmen or slaves, and their children (*Gen.* xvii., 12, 13): 'He that is born in thy house, and he that is bought with money of any stranger, which is not of thy seed: he that is born in thy house, and he that is bought with thy money, must needs be circumcised.'

The prevalence of circumcision among various antient nations is mentioned by Herodotus (ii., 36, 37, 104), by Diodorus Siculus (i., 26 and 55, iii., 32), and others. Herodotus says that the Colchi, the Egyptians, and the Ethio-

pians, were the only nations who had practised it from time immemorial, and that the Phœnicians and the Syrians of Palestine (the Jews) admitted that they had acquired the custom from the Egyptians. This notion, that the Jews had learned circumcision from the Egyptians, has been taken up and maintained in modern times by Sir John Marsham in his 'Chronicus Canon Ægyptiacus,' and others. (See De Pauw's *Recherches Philosophiques sur les Americains*, tom. ii., pp. 117—150; and a note of Gibbon's to the 47th chapter of his history.) But supposing this opinion to be false, it does not follow, on the other hand, as has been contended by some, that all other nations among whom the custom prevails must have derived it from the Jews. It has been supposed by some critics (but in our opinion without good reason), that among the antient Egyptians it was only the priests and those who desired to study the sciences of which they were the teachers, who were obliged to be circumcised. See the notes of Wesseling and Larcher on the passages of Herodotus above referred to, the Commentary of Origen on the 'Epistle to the Romans,' ch. ii., v. 13, and a curious note of M. Huet on Origen's Commentary on Genesis. (Origenis Opera, à Car. de la Rue, 4 vols. fol., Par., 1733, &c.; vol. ii., p. 16.) It is said that Pythagoras submitted to the operation of circumcision in order to obtain instruction in the secret doctrines of the Egyptian priests. (See, upon the origin of circumcision, a note on the 4th sect. of the 22d chapter of Volney's *Revolutions of Empires*.)

Strabo (book xvii., 824) says by mistake that the Jews practised excision on their female children; but, although this was never a custom of the Jews, it has prevailed, and still does, among other nations, particularly the Abyssinians, Nubians, and the modern Egyptians. See Ludolphi, 'Hist. Aethiopica,' iii., 1; Niebuhr's 'Description de l'Arabie,' pp. 67—71, and the 52d of the questions drawn up by Michaelis, pp. 105—109; Sonnini's 'Travels in Egypt,' Hunter's translation, vol. ii., pp. 29—38; 'Description de l'Egypte' (edit. of 1823), vol. xiii., p. 213; and especially Browne's 'Travels in Africa, Egypt, and Syria,' 2nd edit., pp. 394—400.

It is remarkable that circumcision has been found to prevail, and in some cases the excision of females also, among various savage or imperfectly-civilized races. It is said that the rite was practised by the Mexicans when the Spaniards first became acquainted with them. Cook found an imperfect species of circumcision, consisting of the slitting of the prepuce, in use among the natives of the Friendly Islands. (Kerr's *Voyages*, vol. xiii., p. 62.) Long before, many of the old voyagers had met with it among the islands of the Indian Archipelago, among the tribes of the west coast of Africa, and elsewhere. In Purchas's Collection, Edmund Scot gives a long account of the ceremonial of the circumcision of the king of Bantam in Java, at which he was present in 1605. Captain William Keeling, in 16[illegible], states that he found the people at the bay of St. Augustine, on the west coast of Africa, circumcised; and Captain Richard Jobson describes the ceremony as he witnessed it at Batto, on the same coast, in 1621. An abstract of these and other early accounts may be found in Prevost's 'Histoire Générale des Voyages,' iii., 211, &c. See the same work (viii., 601) for a description of the ceremony of circumcision as practised among the people of Madagascar. Dampier, in his graphic manner, describes the mode of circumcision as he witnessed it performed in 1686 at the Philippine Islands. (*Voyages*, i., 339—343.) An account of what he calls the circumcision of females as well as of males by some of the African tribes is given by Bosman in his 'Description of the Coast of Guinea,' English translation, 2nd edit. pp. 179, 180, 329, 414. The principal distinction between circumcision as practised by the Jews and by other nations, is that the former, in obedience to the terms of the command given to Abraham, always when it is practicable circumcise the child on the eighth day after its birth; whereas, among other nations it is usually deferred to a much later period. Among the Mohammedans it is commonly performed in the thirteenth year, because Ishmael, the progenitor of the Arabs, was of that age when he underwent the operation. (*Gen.* xvii., 25.)

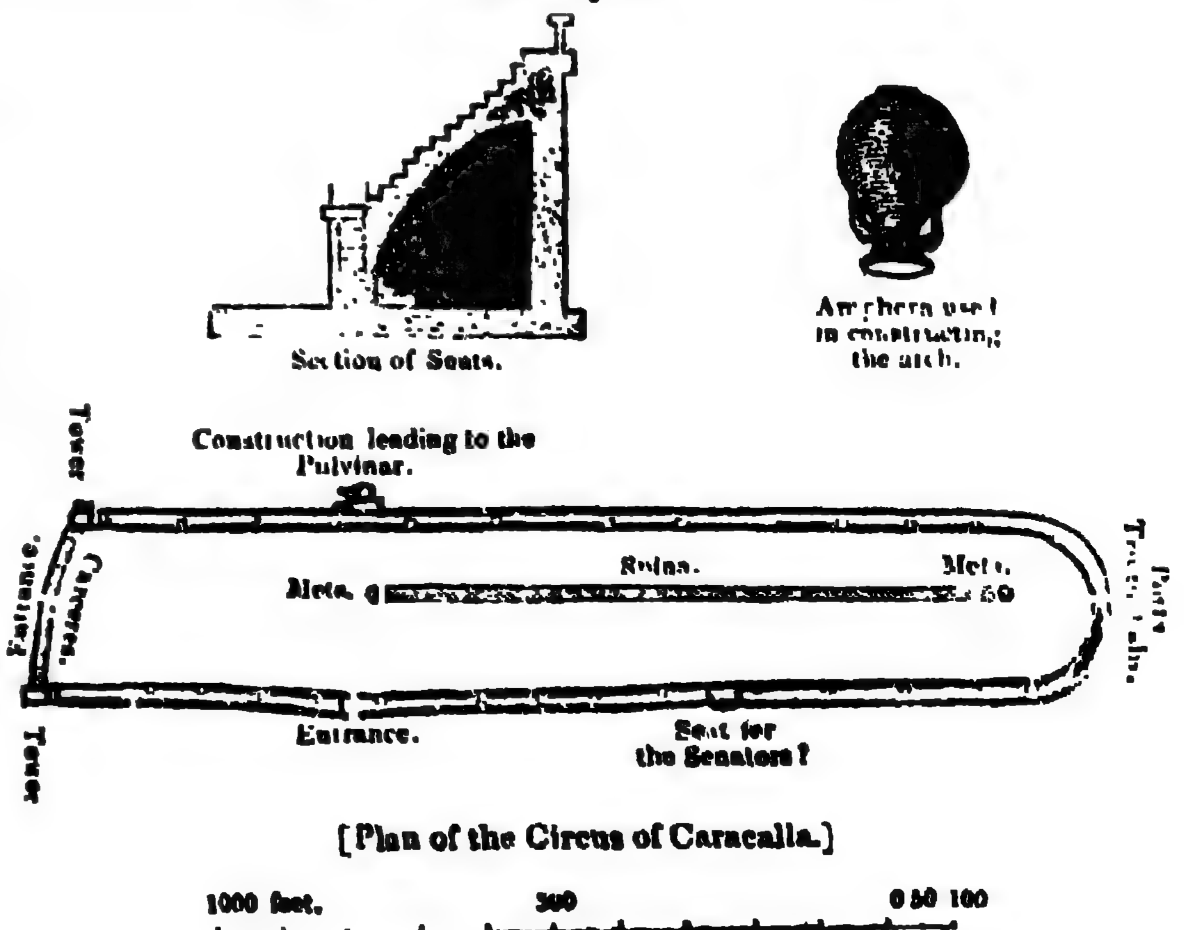
Kolben, in his 'Present State of the Cape of Good Hope' (translated by Medley, 2nd edit., i., pp. 112—119), gives an account of a very singular custom of the Hottentots, which he conjectures may have been derived from the Jewish circumcision.

Besides the authorities already referred to, the reader may consult the articles on circumcision in 'Hofman's Lexicon Universalis,' and in the 'Encyclopédie.' In the latter will be found an account of the opinions of both the Jewish rabbis and the Christian fathers on the doctrinal questions connected with the subject of circumcision. On the medical, including both the physical and moral, part of the subject, see Michaelis and Niebuhr, as already referred to; the *Encyclopédie, Art. Prepuce;* Bartholini's *Comment. de Morbis Biblicis;* and Drake's *New System of Anatomy*, 2nd edit., vol. i., pp. 127, 128.

CIRCUMFERENCE (*circum* and *fero*), the line which goes round a figure. We do not know why, but this word is always applied to a curvilinear figure; while the synonymous Greek word periphery (περί, φέρω) is used for a rectilinear figure.

CIRCUMFLEX. [ACCENT.]

CIRCUS, a large enclosed space, adapted for chariot-races, an amusement to which the Romans were passionately attached. The name Circus (of which Circulus, a *circle*, is a diminutive) does not convey an exact idea of the form of this building, which both in its outline and its use very much resembled the Greek Stadium. There were many circi in Rome, of which the Circus Maximus and the Circus Agonalis were perhaps the largest. The former may still be distinctly traced; the latter retains its external form only in the Piazza Navona of Rome. The Circus Aurelianus, or, according to some, of Heliogabalus, stood near the Amphitheatrum Castrense. The ruins of the Flaminian Circus are hid beneath the pavement of the city. The Circus of Nero was begun by Caligula; part of its site is now occupied by the Basilica of St. Peter. This circus is said to have been longer than the cathedral and colonnade in front. (Fontana's *Tempio Vaticano*, p. 245.) Another circus, begun by Nero, and finished by Hadrian, was situated in the gardens of Domitia, near the Mausoleum of Hadrian. Several antiquities and paintings were discovered here a few years ago. In the Gardens of Sallust there was a fine circus, which was also adapted for the exhibition of naumachiæ. The Circus of Flora was on the Quirinal Hill. There is a circus, not far from the Appian Way, near the tomb of Cæcilia Metella, about two miles from Rome, in a high state of preservation. It is probably of a later date than many of those which were constructed within the city; and perhaps to the circumstance of its being at a distance from the city walls, its present state of preservation may principally be owing. Antiquaries have called it the Circus of Caracalla, although no proof, we believe, has been discovered from inscriptions that this is the circus built by, and commemorated on the coins of, that emperor.

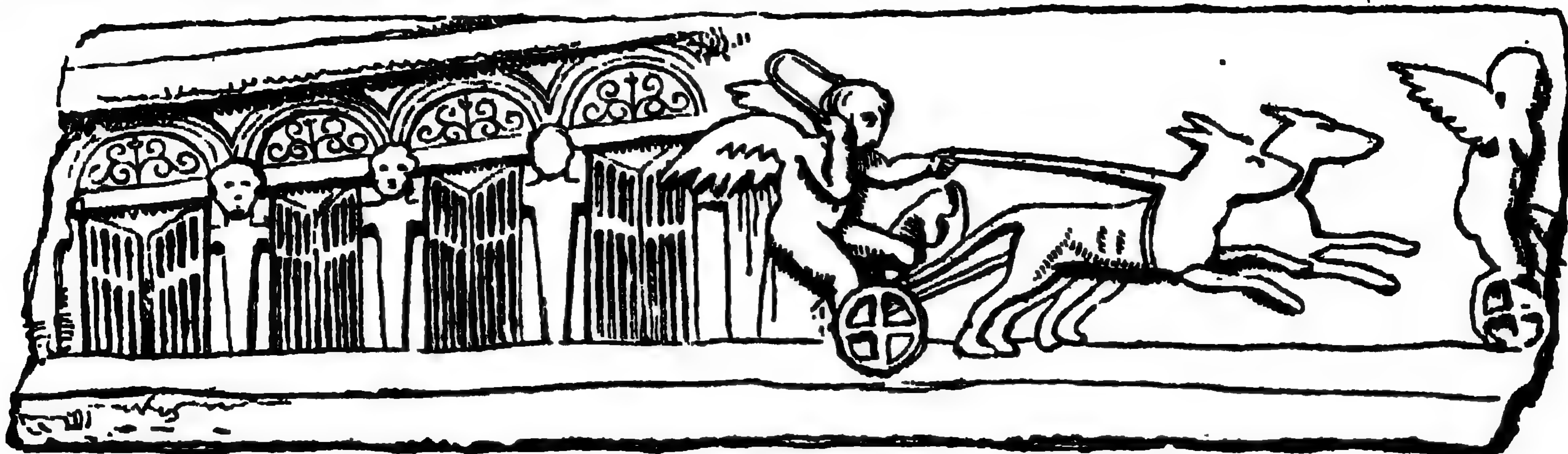


[Plan of the Circus of Caracalla.]

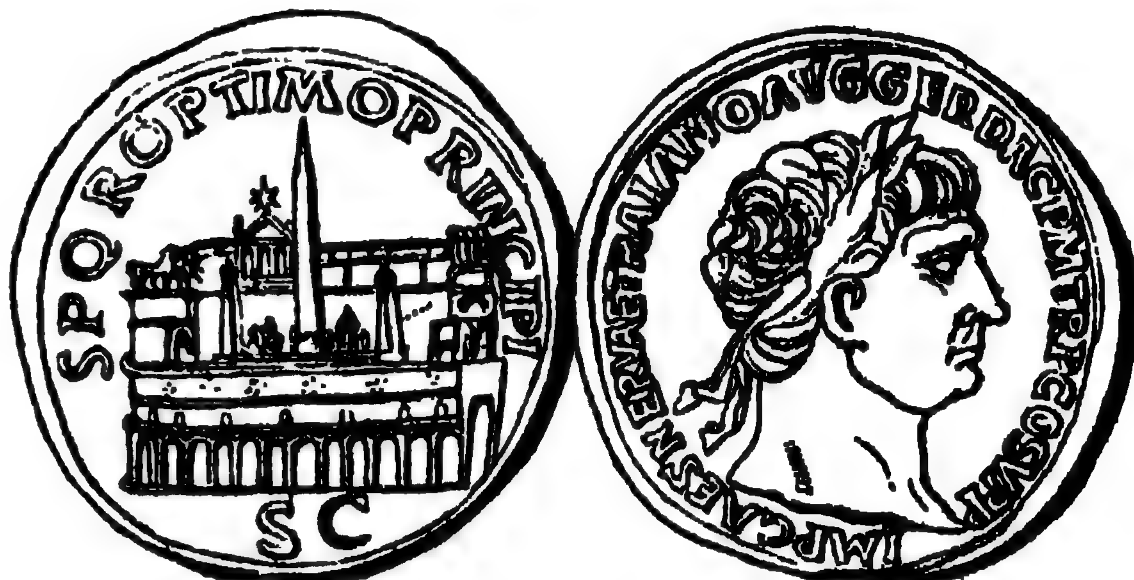
Bianconi makes the Circus of Caracalla 255 French toises long, and 50 toises wide; the spina 142 toises long, and the start from the carceres to the spina 79 toises. The widths of the openings between the spina and the walls of the circus are 21·3 toises at the first goal, 19·3 at the second goal, 17 toises at the turn on the other side of the second goal, and 15·4 toises at the final goal. The width of the vaulting is 4 toises. (A toise is about 6·396 English feet.)

The Circus of Caracalla, of which we have given a plan and a section of the seats, may be considered a perfect model of this kind of building, both in judicious arrangement and ingenious construction. The long sides are not quite parallel: one end is semicircular, and the carceres at the opposite end, from which the chariots started,

are formed on a segment of a circle, the chord of which is inclined to the long sides of the circus. The spina, or raised division, which runs along the middle of the circus, is a kind of podium or basement, in appearance like a thick dwarf wall. It is not exactly parallel to either side of the circus. Of the carceres, which are twelve in number, six are placed on each side of the entrance which was intended for the use of the processions, and are so disposed, by the inclination of the chord line of the segment on which they may be said to be set off, that the starting of the twelve chariots was equalized. The carceres were most probably covered; they were also divided by partition walls with terminal figures in front of them, and arched over, with a cornice above the arches: the semicircular opening was filled with a window frame of marble, highly enriched; and they were closed with gates, most probably of bronze. A very tolerable idea of the architectural appearance of a Circus may be formed from the inspection of a bas-relief in the British Museum.



There is also a representation of a marble fragment in Bianconi's work on this circus, in which men are seen opening the bronze gates, in order, as we may judge from their hurried action, to let out the chariots at the given signal. The spina, which was rounded at the two extremities, was decorated with metæ, or goals, each formed of three long cones.* The eggs were placed on the apex of each cone. Dolphins were also employed for this purpose: these cones were sometimes gilt. In the basement of the cones in the Circus of Caracalla there is a small chamber formed; and the basements are separated from the spina. In the centre of the spina there was sometimes one of those enormous obelisks which were brought by the emperors from Egypt. Previous to the time of Augustus, a long pole occupied the centre. Small temples, statues, columns with statues on their summits, and altars, adorned the intermediate spaces between the centre and the goals; so that the spina must have presented a highly decorated and very beautiful appearance. The Porta Triumphalis, or gate by which the victor left the circus, was at the end opposite to the carceres. It is not improbable that the pulvinar, or emperor's seat, which, in the Circus of Caracalla, was a loggia with columns, was constructed at that part of the circus where the emperor, being near the carceres, would have the best view of the start and of the arrival at the goal. At the ends of the carceres of the Circus of Caracalla were two towers, in one of which is a staircase leading to the roofs of the carceres. The people occupied the stone seats along the sides and at the semicircular end of the circus. The Euripus, a canal ten feet wide and ten deep, was formed as a protection to the spectators, when they were not separated from the open space by a high podium or basement. The Circus of Caracalla has the podium and no Euripus. Some notion of the appearance of the circi may be collected from the medals of Caracalla and Trajan. In these medals the metæ and the quadrigæ are discernible, and the obelisk in the centre of the spina.



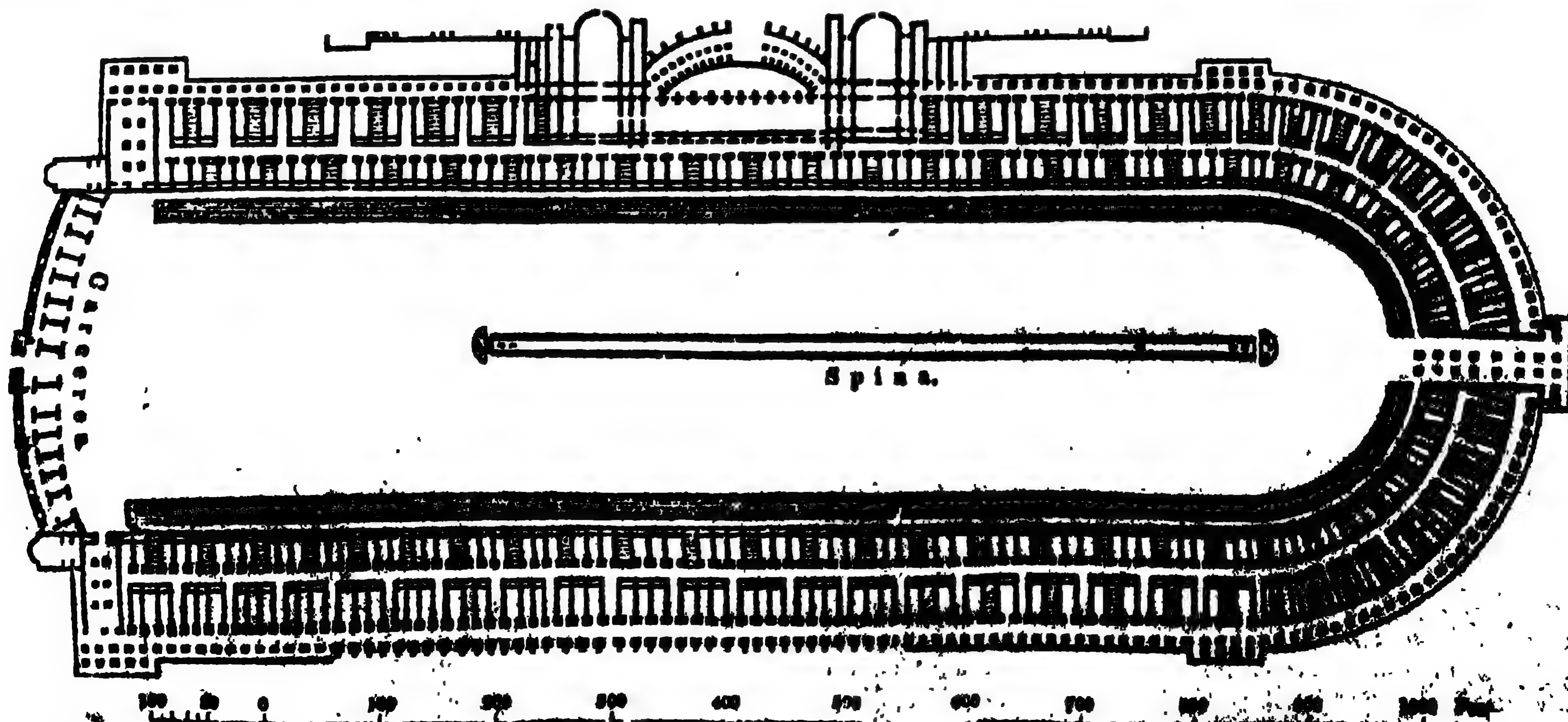
[Coin of Trajan.]

British Museum. Actual size. Bronze. 414 grains.



[Coin of Caracalla.]

British Museum. Actual size. Bronze. 469 grains.



[Scale for the Circus Maximus, according to Vasari's plan.]

* See a representation of these cones in the Library of Entertaining Knowledge, Townley Gallery, vol. i., p. 141.

In order to lighten the weight of the materials used in the construction of the arch which supports the seats of the Circus of Caracalla, large amphoræ have been employed in the crown of the arch. Under this archway the people passed to the various openings with steps which led to the seats. The archway formed one great vomitorium. Although there were twelve carceres, the number of chariots varied: in a representation of a chariot-race on a sepulchral monument at Foligno, nine are represented.

The Circus Maximus, which was situated in a valley between the Palatine and Aventine hills, was very similar in form to that of Caracalla. It is stated, in the *Encyclopédie Méthodique*, to be 2345 feet 6 inches in length, by 1029 feet 7 inches wide; but, according to Venuti, it is only 210 French toises long by 85 wide; that is, 1343·160 feet by 543·2. To Tarquinius Priscus tradition assigned the first building of a circus, on the site of which the Circus Maximus was afterwards erected. If ever there was a Circus of Tarquin, it may have been rebuilt after the destruction of the city by the Gauls. This edifice, whatever may have been its origin, was enlarged by Cæsar, and embellished by Augustus and Tiberius. In the time of Nero it was burnt down (Tacit. *Annal.*, xv., 35); Trajan repaired it; and under Antoninus it became partially ruined, but was afterwards restored. The exterior of the circus, except at the carceres, consisted of two stories, adorned with columns, and finished with a terrace. The ground floor was occupied by merchants, except on the days appointed for the games. There were four towers more in the Circus Maximus than in that of Caracalla; one in the centre over the carceres (equidistant from those at each end of the carceres), one over the principal entrance, and one at each end of the semicircle, where it joined the straight sides of the circus: these towers were crowned with quadrigæ. The spina, which was rather more than eight feet high and twelve broad, was decorated with temples in miniature, statues, and obelisks. Augustus brought an obelisk from Egypt, 126 feet high, and placed it in this circus; Constantius also erected in the circus the obelisk now called the Lateran, which is the largest of all the Roman obelisks.

There are traces of a circus at Tarragona, at Merida, at Murviedro (the ancient Saguntum), all in Spain; also at Nismes, Milan, Antioch, at Constantinople, and other places.

For some curious information concerning the Circus of Caracalla, see the Cavaliere Bianconi's work on that building; *Plan of Rome*, published by the Society for the Diffusion of Useful Knowledge; Nardini's *Rome; Encyclopédie Méthodique*, 'Architecture;' *Topografia delle Antichità de Roma*, dell'Abate Ridolfino Venuti.

The games, which derived their name, *ludi Circenses*, from the circumstance that, after the time of Tarquinius, they were celebrated in the circus, were, according to tradition, instituted by Romulus under the name of Consualia (Livius, i. 9), in honour of the god Consus (or Neptune). They were exhibited on various occasions and for various purposes; sometimes, for example, by magistrates and sometimes by private citizens; either as rejoicings for success in war, or to avert the anger of some god. A grand procession from the capitol to the circus opened the games, and the images of the gods were taken along in carriages (*thensæ*). The combatants, dancers, musicians, and others followed, and last of all the consuls and priests advanced to perform the sacred rites. The exhibition consisted chiefly of chariot and horse races. The charioteers were divided into four classes, distinguished by the colour of their dress; one was white, another red, another sky-coloured, and another green. Domitian added two more, the golden and the purple. The favour of the people to one class or another was determined quite as much by the dress as by the skill displayed. Serious consequences often followed the disputes on the superiority of one colour above another. The order in which the chariots stood was determined by lot; and the signal for starting was given by dropping a cloth (*mappa*, or *pannus*). The chariot which first ran seven times round the course was victorious, and the driver, after being proclaimed by the herald, was crowned with a palm-wreath, and received a considerable sum of money. There were usually twenty-five such heats in the course of a day. Contests in the five exercises (*quinquertium*, the Greek πένταθλον), running, leaping, boxing, wrestling, and throwing the discus, also formed part of the exhibition. Wrestlers were anointed with ointment by slaves: boxers used gloves strengthened with lead or iron to give force to their blows; all underwent a preparatory training and dieting. These exercises were performed by the combatants almost entirely naked, and hence were called sometimes *certamen gymnicum;* the combatants had only a slight covering round the middle. A mock-fight, called *ludus Trojæ*, was performed by young noblemen on horseback; an exhibition which was revived by Julius Cæsar. (Virgil, *Æn.* v. 561.) A sea-fight (*naumachia*) was sometimes represented: Domitian afterwards built a sea-fight theatre. (Suetonius, *Domit.* c. 5.)

The exhibition of the wild beasts (*venatio*) was one of the most attractive parts of their public entertainments. Wild beasts fought either with one another or with men; and the men were either forced to this combat as a punishment, or were induced to enter it by hire. Great expense was incurred to provide beasts for this exhibition, and they were collected from the most remote parts of the empire. In the days of imperial splendour and profusion, the public exhibitions of Rome contained nearly every rare wild animal that western Asia and northern Africa could produce. The beasts were kept in inclosures (*vivaria*) till the time appointed for the show. The exhibitor of the games (*editor spectaculorum*) presided on a seat (*pulvinar*) at the south side of the building. So passionately fond were the people of these games, that the expression *Panem et Circenses*, 'Bread and the Circensian Games,' was commonly used to signify the two prime necessaries of life to the Roman populace. The crowds brought together by the games naturally attracted such persons as conjurers, jugglers, and fortune-tellers to the place, which is hence called by Horace (Sat. i. 6, 113) *fallax*, 'deceitful.' The splendour of the exhibition increased in the later times of the republic. P. Cornelius Scipio and P. Lentulus once exhibited sixty-three panthers, and forty bears and elephants (Livius, xliv. 18); and Pompey on one occasion is said to have exhibited five hundred lions (a number beyond all belief), which were all dispatched in five days. (Dion. Cass. xxxix. 38.) (Pitiscus, *Lexic. Antiquit. Roman.*; Dr. Adam's *Roman Antiquities*, p. 311, &c.)

CIRCUS. [Falconidæ.]

CIRENCESTER, colloquially called Ciceter, is an antient market town and parliamentary borough in the S.E. part of the county of Gloucester, and in the hundreds of Crowthorn and Minety. The town includes five hamlets or tythings, Oakley, Wiggold, Spiringate, Barton, and Chisterton, and is about 84 miles W.N.W. from London in a straight line, and 17 miles S.E. from Gloucester. It is pleasantly situated on the river Churn, antiently the Corin, which joins the Thames at Cricklade: and hence, as a Roman military station, the place was called Corinium or Cornovium, and Corin Castra. Three Roman roads, the Fossway, the Ermin Street, and the Icknield Way, all met at Cirencester. A branch of the Thames and Severn Canal comes to the town. It was a place of considerable importance during the Roman occupation of Britain, when its walls, of which partial traces still exist, were two miles in circumference. During the Heptarchy it was successively included in the kingdoms of Wessex and of Mercia. A great number of Roman and Saxon antiquities have been, and continue to be, found in and near the town. In 879 it was stormed and taken by the Danes, and was the seat of a great council held by Canute. It was again stormed and completely dismantled in the civil war of Henry III. with the barons. Lords Surrey and Salisbury, in the reign of Henry IV., having promoted an insurrection for the restoration of Richard II., these noblemen, with several of their accomplices, were killed at a public-house in the town by the bailiff and a party of the inhabitants. Their heads were sent to London as a present to King Henry. A magnificent abbey for black canons was built in 1117 by Henry I., on the foundation of a college for prebendaries, which was established by the Saxons long before the Conquest. The revenue of this abbey at the dissolution of monasteries under Henry VIII. was 1051*l.* 7*s.* 1*d.* and its mitred abbot had a seat in parliament.

The town government is vested in two constables and fourteen wardsmen, elected annually. It has returned two representatives to parliament since the reign of Elizabeth. The borough is not incorporated: it is a polling place for the east division of the county. The living is a perpetual

curacy, in the diocese of Gloucester. Cirencester had once three churches: that which still exists is a fine old structure of the fifteenth century, very elaborately ornamented externally and in the interior. Its embattled tower contains a peal of twelve bells. Cirencester is not a place of much trade; it has however an extensive clothing and a small carpet manufactory. Its appearance is that of a very respectable and opulent country town. Several streets of houses have been recently built, and others are in progress. The town is paved and lighted, and well supplied with water. It has a grammar-school, three endowed hospitals or almshouses, and several charitable institutions for education and other purposes: the total income of these charities is considerable. It has also an agricultural association, and annual races. The Baptists, Friends, Methodists, and Unitarians have chapels. Population of the parliamentary borough in 1831, 5240. Market-days Monday and Friday. Fairs on Easter Tuesday, on July 18, on Monday before and after Michaelmas, and on November 8, chiefly for agricultural stock and produce. In the vicinity is the handsome mansion of Oakley Park, the seat of Earl Bathurst. For a detailed historical and topographical description of Cirencester, see *Hist. of Cirencester*, by Rudder, 1800: Brayley and Britton's *Beauties*; and the *Histories of the County of Gloucester*, by Atkyns, Rudge, and Bigland.

CIRL BUNTING. [EMBERIZIDÆ.]

CIROLANA. [ISOPODA.]

CIRRATULUS. [DORSIBRANCHIATA.]

CIRRHIBA'RBA, a genus of fishes of the family Gobioides, and section Acanthopterygii. But one species of this genus is yet discovered, and this is from India. It has a tentaculum over each eye and nostril, three large tentacula at the end of the muzzle, and eight under the point of the lower jaw. These tentacula constitute the chief distinction between our present genus and that of Clinus, to which it is closely allied.

CIRRHI'GRADA. An order (the second) established by De Blainville for a small number of radiated gelatinous animals of the class *Arachnodermata*. Linnæus placed them among the *Medusæ*, to which they bear some external resemblance, but from which they differ, first, in having a transparent cartilaginous support, which sustains the dorsal disk of the umbrella of these creatures; and secondly, in having the proboscidiform stomach, which occupies the lower disk, accompanied by a great number of highly contractile and extensible tentaculiform cirrhi, very different from the appendages with which the *Medusæ* are supplied. De Blainville says that they have evidently more proximity to the tentacula of the *Actiniæ*, and perhaps even to the tentaculiform cirrhi of *Physalia* and the neighbouring genera; but that not having had an opportunity of studying the species except from individuals preserved in spirit, he is unable positively to decide on their natural position in the system, though he is led to regard them as approximating more to *Actinia* than to any other genus. He throws out a hint that the cartilaginous support may perhaps be regarded as a polyparium, and that it is, in fact, analogous to the calcareous part in *Cyclolites*, &c. Lamarck placed the genera among his *Anomalous Radiaria*, a section of his division of soft radiated animals (*Radiaires Molasses*), and next to the first genera of his *Radiaires Medusaires*; viz., *Eudora, Phorcynia, Carybdea*, &c. Cuvier arranges them under his *Simple Acalephans*, next to *Cestum*, observing that the two genera (*Porpita* and *Velella*) might form a small family in that order by reason of the internal cartilage which supports the gelatinous substance of their bodies. The following is De Blainville's definition of the order:—

Body, oval or circular, gelatinous, sustained in the interior of the dorsal disk by a solid subcartilaginous part, and provided on the lower surface of the disk with tentaculiform cirrhi, which are very extensible.

Genera. VELELLA.

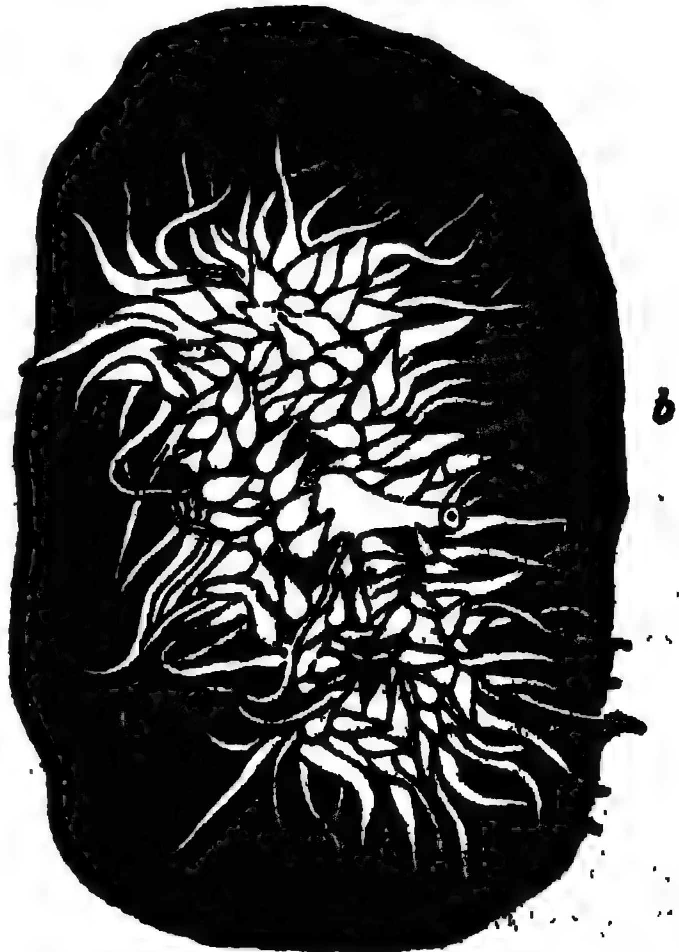
Body membranous, oval, very much depressed, convex, swollen, sustained above by a transparent oval subcartilaginous piece, marked with concentric striæ, and surmounted by a vertical and oblique crest, concave below, with a sort of mesial nucleus, offering a central mouth at the extremity of a proboscidiform prolongation, surrounded by tentacular cirrhi of two kinds, the external being much longer than the internal ones.

De Blainville observes that Imperato and Columna would appear to be the authors who first noticed the animals which constitute this genus, established at first, under the name of *Phyllidoce*, by Patrick Browne, and figured by him in his 'History of Jamaica,' tab. 48, fig. 1. Forskahl, who gave a very good description of it, arranged it under his genus *Holothuria*. Lœfling made it a *Medusa*, denominating the species known to him *Medusa Velella*, a name adopted by Linnæus in the *Systema Naturæ*. Dana (*Soc. Roy. de Turin*, 1766) proposed the name of *Armenistarus* for it; and Lamarck published it under the generic appellation of *Velella*, by which it is now generally known to naturalists.

Geographical distribution, habits, and *use*.—This form is widely diffused, and has been found in the seas of Europe, America, Asia, and Australasia. The animals are met with far at sea, and often huddled together, young and old, in considerable masses. Sailors are said to fry and eat them.

Species.—The species (so called) are numerous; but De Blainville observes that he is far from admitting that they are sufficiently distinct; and, indeed, he well observes that he knows not on what characters the specific distinction should rest. Chamisso and Eisenhardt, apparently with good reason, were guided principally by the form of the cartilage and body, and the direction of the crest, and recognized three, confessing however that it had been impossible for them to compare their subjects rigorously with the species proposed by their predecessors. Eschscholtz describes ten, of which half are new, depending upon the form of the crest and the colour of the different parts. De Blainville however doubts whether they are really different. Example, *Velella lata*.





[Velella lata.]
a, upper side; *b*, lower side.

The following description, by Browne, of his *Phyllidoce labris cæruleis*, the *Sally-man*, which appears to be the *Velella cyanea* of Lesson and Garnot, and one at least of the species which gave rise to the *Medusa Velella* of Linnæus and Gmelin (Lamarck quotes the last name as well as Browne's *Phyllidoce*, as synonyms of his *Velella* mu-

tica) is worth recording as that of an eye-witness. By the help of the cuts the reader will readily understand the portion of his account which relates to the parts; but in Browne's figure there are no letters corresponding with the description: still however the notion of the position and motion intended to be conveyed will be understood without any very active exercise of the imagination.

'This insect,' says Browne, 'though evidently of this class, is more firm and opaque than either of the foregoing.' The Portuguese man of war is the animal whose description immediately precedes, 'and consists of an oblong, cartilaginous, flat body, slightly radiated from the centre, and intersected with small concentric lines: but this is furnished with two thin fleshy or semigelatinous lips *b b*, that extend themselves by short vermiform appendices over the under surface of the cartilaginous part. It is also supplied with a semi-elliptical, dry, transparent membrane E, which stands perpendicularly on the surface of the more firm part A, in the direction of the line D D, furnishing it with a pair of constant standing sails, which answer upon all occasions; for when this body is to move in any particular direction, suppose towards X, the part A D D, 1, of the perpendicular membrane, which arches in the direction of the line A D, 1 fills and pushes the body forwards, while the other part floats in the wind. But when the wind changes, and the body is to move towards Z, the other part answers in the same manner, and all the motions are performed by the same mechanism. It is furnished with a great number of slender tentacula, each about half an inch in length, which rise very thick from the margin of the cartilage underneath, and it seems to have an opening or mouth in the centre of the base.'

Rataria.

Body oval or circular, sustained by a subcartilaginous, compressed, elevated piece, with a muscular, movable, longitudinal crest above, concave below, and provided in the middle with a free proboscidiform stomach, and with a single row of marginal tentaculiform suckers.

Eschscholtz established this genus for some very small cirrhigrade animals, whose back is sustained by a subcartilaginous piece, not elevating itself in the dorsal cavity, and which only offer marginal cirrhi on the central surface. De Blainville, after observing that Forskahl has figured with his *Holothuria spirans* (*Velella limbosa* of Lamarck) some very small animals, which M. Eschscholtz himself regards as closely approximating to his *Rataria cordata*, says that it seems possible that the *Ratariæ* may be only degrees of development of *Velella*. Example, *Rataria mitrata*.



[Rataria mitrata, highly magnified.]

Porpita.

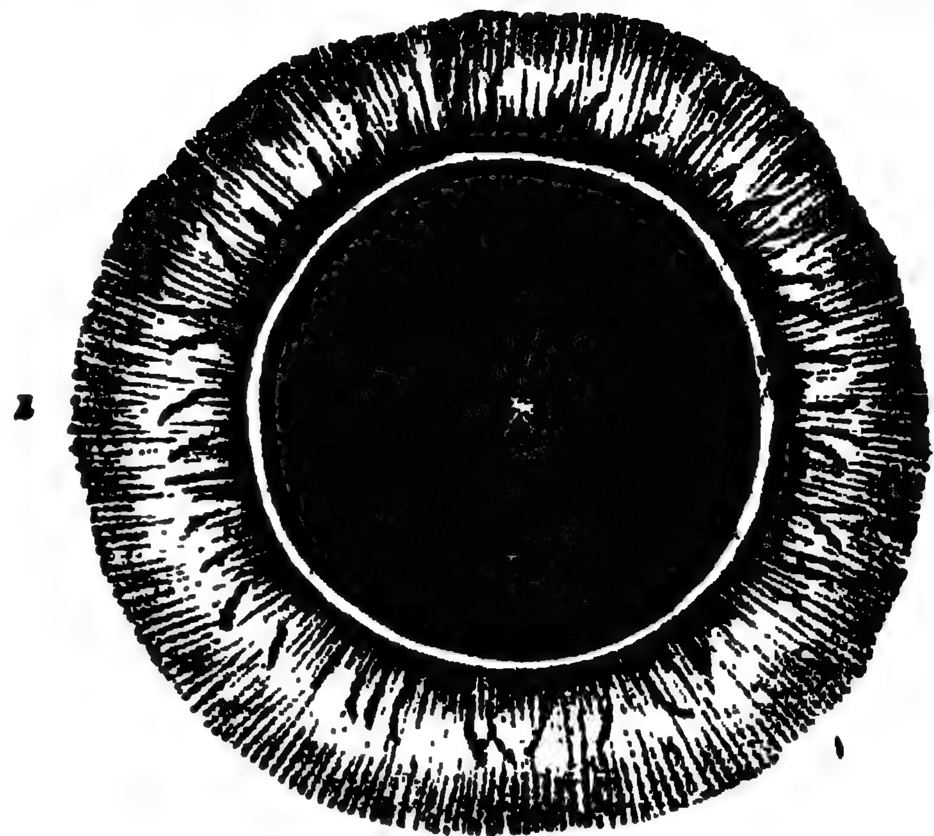
Body membranous, regular, circular, depressed, slightly convex above; internal cartilaginous support, circular, with its surface marked by concentric striæ crossing radiated striæ, covered on its upper surface by a delicate membrane merely. The body is concave below, and the inferior surface is furnished with a great number of tentacula, of which the exterior ones are the longest, and furnished with small cilia, each terminated by a globule: they sometimes contain air, and the internal ones are the shortest, the most simple, and the most fleshy. In the centre of these tentacula is the mouth, in form of a small proboscis, which leads to a simple stomach, surrounded by a somewhat glandular substance.

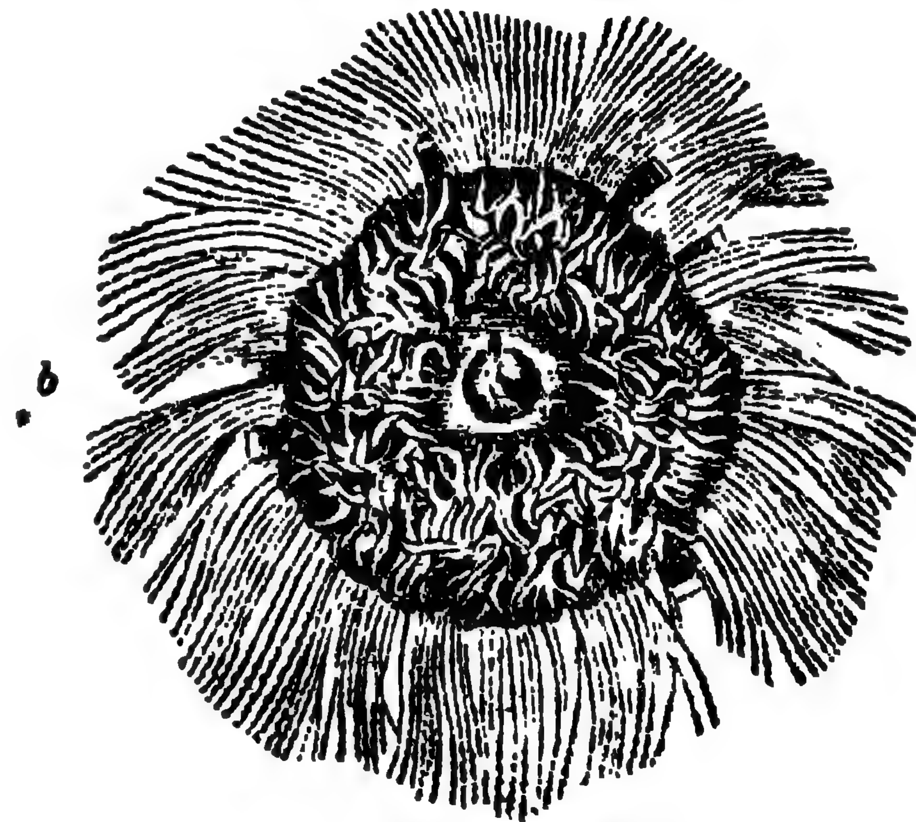
Cuvier, from whom a great portion of the above description is taken, says, in the last edition of the 'Règne Animal,' that there is but one species (*Porpita gigantea*) of a beautiful blue colour, from the Mediterranean and other warmer seas. Lamarck, who established the genus for an animal which had been placed among the Medusæ by Linnæus, gives four species; but De Blainville and MM. Chamisso and Eschscholtz coincide with Cuvier in believing that they are all referrible to one, though the former admits that the fact is still somewhat doubtful. He observes that Bosc's species, *Holothuria appendiculata*, (*Porpita appendiculata*, Lam.) was evidently established on an impaired animal. Eschscholtz, under the name of *Porpita Mediterranea*, conjoins three of Lamarck's species, and describes three new ones, taking for his character the proportion of the cartilaginous disk, and especially that of the marginal cirrhi.

De Blainville, to whose article in the 'Dictionnaire des Sciences Naturelles' we refer the reader for further details, is of opinion that the genera *Velella* and *Porpita* might be united without inconvenience.

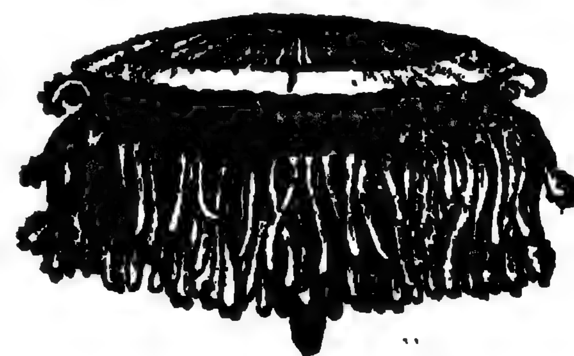
There is a very fair figure of a *Porpita* in an early volume of the 'Philosophical Transactions.'

Geographical distribution.—Like that of *Velella*, very wide. Bosc, who met with them at sea, says the animal has the appearance of a 24-sous piece borne along by the waves. Examples, *Porpita gigantea*, and *Por. glandifera*.





[Porpita gigantea.]
a, upper side; *b*, lower side.



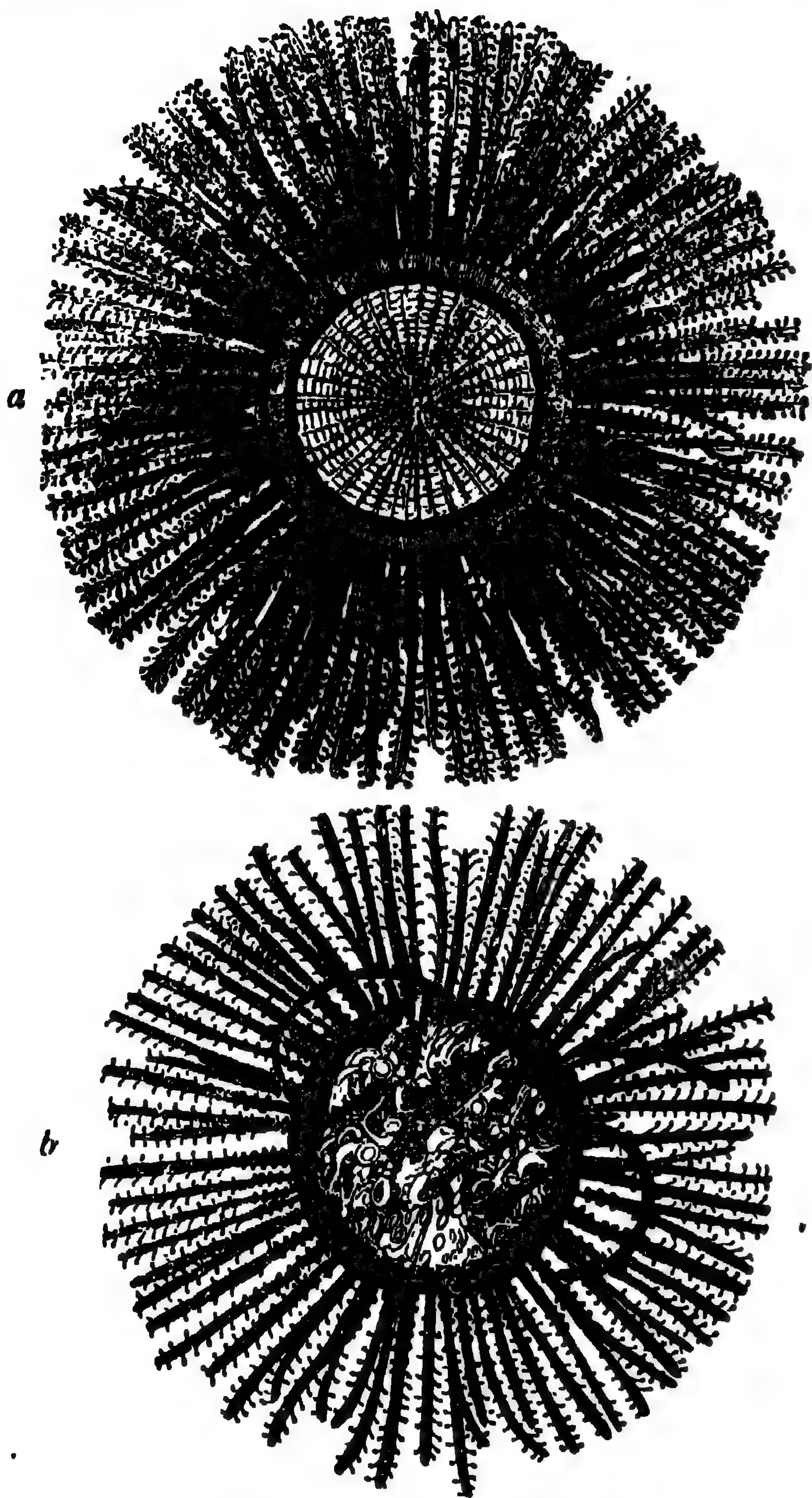
[Profile of Porpita glandifera.]

The Rev. Lansdown Guilding is of opinion that the genus *Porpita* should be restricted to those species which resemble *Porp. appendiculata*, which have few and broader arms, and establishes a new genus of the family *Porpitidæ* under the name of

Polybrachionia.

Dorsal support (sustentaculum) cartilaginous, naked, flattened, rounded, radiated, concentrically striated; *mantle* (pallium) narrow, free, surrounding the support; *arms* numerous, parallel, of various lengths, elongated, affixed beneath, with a power of taking a declining position for the purpose of taking prey; *mouth*, below, central, purse-shaped, extensile; *tentacula* many, varying in form, suctorial, covering the whole ventral surface; eggs very small,

innumerable, nestled among the tentacula, (Guilding). Example, *Polybrachionia Linnæana*. Mr. Guilding describes the support as broad and vitreous, the body as cerulean, the tentacula as pallid, and the arms, which are in a triple series, glandulous, the glandules being pedunculated. The diameter of the mantle, exclusive of the arms, is stated to be eleven and a half lines. Mr. Guilding states that the animal is wonderfully beautiful, swimming, or rather floating on the serene surface of the Caribean Sea in calm weather, and embracing its prey by the sudden downward application of some or all of its arms, which are easily broken by attrition.



[Polybrachionia Linnæana, enlarged.*]

a, upper side; *b*, lower side.

We think there is hardly enough to warrant a generic separation in this case; the species bears a strong resemblance to the *Porpita cærulea* of Eschscholtz. Mr. Guilding observes that the *Medusa porpita* of the 'Amœnitates Academicæ' seems nothing more than the central disk of some species deprived of all the organs of the body.

CIRRHI'NUS, a genus of fishes. [GOBIO.]

CIRRHI'PATHES. [ZOOPHYTARIA.]

CIRRHOBRANCHIA'TA. [DENTALIUM.]

CIRRHUS. (Conchology.) [TURBINIDÆ.]

CIRRI'PEDA, or CIRRHIPEDA.† *Lepas* of Linnæus, *Cirrhopodes* of Cuvier and Férussac, *Cirrhipèdes* of Lamarck, *Nematopodes* of De Blainville, *Cirripèdes* of Latreille: a well-defined natural group of marine invertebrate animals, whose place in the system has occasioned much doubt and difference of opinion among zoologists. In the earlier times the most absurd stories were propagated and believed in relation to one of the most common genera, *Pentalasmis anatifera*, *Lepas anatifera* of Linnæus, the common or duck barnacle. To the references on this head given under the article 'BERNICLE,' we shall only add the testimony of Sir Robert Moray to show how long the delusion lasted, and in what positive terms a witness can state the thing that is not. 'In every shell that I opened I found a perfect sea-fowl; the little bill like that of a goose, the eyes marked, the head, neck, breast, wings, tail and feet formed, the feathers every where perfectly shaped, and blackish-coloured, and the feet like those of other water-fowl, to my best remembrance.' The Roman Catholics are permitted, in France at least, to eat the bernicle goose upon fast days and during the whole of Lent, in consequence of its supposed marine origin.

Organization, and place in the natural system.—Linnæus placed the *Cirripedia*, with the generic name of *Lepas*, among the *Multivalves* of his *Vermes* (*testacea*), between *Chiton* and *Pholas*; and, supposing that the form existed without a shell, found a situation for it under the name of *Triton*, between *Terebella* and *Lernæa*. Cuvier, in the first and also in the last edition of the 'Règne Animal,' says that the existence of these Tritons is not confirmed, and that we must suppose that Linnæus had only seen the animal of an *Anatifa* (Pentalasmis) which had been taken out of its shell. Rang, however, thinks that he has found the Linnæan genus *Triton* in certain specimens brought home by MM. Lesson and Garnot, Quoy and Gaimard, and has published it under the name of *Alepas*. Bruguières divided the genus *Lepas* into two; the first, *Anatifa*, a barbarous word for *Anatifera*, the Anatifes of the French, comprising the pedunculated cirripeds; and the second, *Balanus*, the sessile species. Cuvier, under the name of *Cirrhopoda*, made these animals the sixth class of his *Mollusks*, which he places between the *Brachiopoda* and the first class (Annélides) of his third great division of the animal kingdom, viz., the articulated animals, and in the 'Règne Animal' they appear between *Orbicula* and *Serpula*. Lamarck, under the name of *Cirrhipeda*, his tenth class of invertebrate animals, arranges them between the sedentary *Annelides* and his *Conchifera*, dividing them into two orders: 1st. The sessile cirripeds; 2nd. The pedunculated cirripeds. In his system they stand between *Magilus* and *Aspergillum*. Latreille, though he does not disturb this arrangement, evidently considers them as related to the *Ostracoda*, among the Branchiopodous crustaceans. He says that the sessile cirripeds seem to represent the animals which terminate the *Acéphales enfermés* of Cuvier. He observes that the two tubular processes of *Otion* represent the two tubes of some of the *Acephala*, though with different uses, the tentacula being converted into jaws. The *cirri* he considers as a kind of feet analogous to the sub-abdominal appendages of many crustaceans, especially those of the *Amphipoda*, and is of opinion that we may also compare them to those of many annelids. The oviduct, he remarks, has some resemblance to that of *Phalangium*. Finally he expresses a conjecture that nature, to form the *Cirripeds*, has borrowed different organs from animals of several classes. Mr. William Sharp MacLeay, in his profound and philosophical work, 'Horæ Entomologicæ,' considers that *Pentalasmis* exhibits the greatest affinity with the *Ostracoda*; but he seems to be of opinion that there exists an affinity between the shell of *Balanus* and that of *Echinus*, and sanctions Latreille's opinion that the articulated *cirri* have their analogues in the arms of the *Radiata*, particularly of *Comatula*. Dr. Leach, who has described several genera unnoticed till his time, divided the class into two orders: 1st. *Campylosomata*, comprising the pedunculated section; and 2nd. *Acamptosomata*, including the sessile species. M. de Blainville makes the cirripeds the first class (*Nematopoda*) of his subtype *Malentozoaria*, a group which corresponds to the Multivalves of Linnæus, after separating from them the genus *Pholas*, so that De Blainville's *Malentozoaria* consist of the *Cirripeds* and *Chitons*. The Cirripeds, he thinks, have an evident relation to the Bivalve Mollusks, by means of their calcareous envelope, in which he recognises the pieces of the shell of the *Pholades*, and even the analogue of the tube of the neighbouring genera. He also considers the relationship further indicated by the recurved position of the animal fixed head downwards (*la tête en bas*): but he also considers that their relations to certain animals of the type *Entomozoaria* are numerous, by means of the horny, locomotive, articulated appendages which are branchial, at least at the root, becoming, towards the mouth, true horny, denticulated jaws. Mr. Thompson, in his 'Zoological Researches,' considers the Cirripeds to be true *Crustacea*, and that in the first state of these animals they not only possess perfect free-

* From Mr. Guilding's figure, 'Zoological Journal,' vol. iii., p. 404, pl. X.

† The terms at the head of the article are those generally used by zoologists; but, correctly, the word should be *Cirripedia*, and Burmeister adopts that mode of writing.

dom and power of motion, but organs of sight. On the 28th April, 1823, Mr. Thompson states that he took in a small muslin towing net, while crossing the ferry at Passage, among other minute creatures, a small translucent animal, one-tenth of an inch long, of a somewhat elliptical form, but very slightly compressed laterally, and of a brownish tint. When in a state of perfect repose it resembled a very minute muscle, and lay upon one of its sides at the bottom of the vessel of sea-water in which it was placed; at this time all the members of the animal were withdrawn within the shell, which appeared to be composed of two valves, united by a hinge along the upper part of the back, and capable of opening from one end to the other along the front, to give occasional exit to the limbs. These were of two descriptions, viz.: anteriorly a large and very strong pair, provided with a cup-like sucker and hooks, serving solely to attach the animal to rocks, stones, &c., and, posteriorly, six pairs of natatory members, so articulated as to act in concert and to give a very forcible stroke to the water, causing the animal, when swimming, to advance by a succession of bounds, after the same manner as the water-flea (*Daphnia*) and other *Monoculi*, but particularly *Cyclops*, whose swimming feet are extremely analogous. [BRANCHIOPODA.] The tail, usually bent up under the belly, is extremely short, composed of two joints, and terminating in four *setæ*, and is employed to assist in progression and in changing the position from a state of repose. The greatest peculiarity however in the structure is in the eyes, which, although constantly shielded by the valves of the shell, are pedunculated as in the crab and lobster, and placed entirely at the sides of the body. Mr. Thompson observes that this animal, but for its pair of pedunculated eyes, would find a place as a new genus of *Ostracoda*; that its members approximate it to *Argulus* on the one hand and to *Cyclops* on the other, genera which are widely separated; while the eyes show its relationship to the *Decapoda* (crabs, lobsters, &c.) The individuals presented no variation indicative of a difference of sex; and this, with their anomalous organization, induced a belief that they were the larvæ or disguised states of some crustaceous animal, or (as it had been previously ascertained that the *Cirripeds* were *Crustacea*) that they were the males of these, Mr. Thompson not being disposed to believe that the two sexes were united in the same individual. What follows being of the last importance, we give in the author's own words: 'Under the foregoing impressions, some of them were collected in the spring of 1826, and, in order to see what changes they might undergo, were kept in a glass vessel, covered by such a depth of sea-water that they could be examined at any time by means of a common magnifying glass; they were taken May 1st, and on the night of the 8th the author had the satisfaction to find that two of them had thrown off their exuvia (exuviæ) and, wonderful to say, were firmly adhering to the bottom of the vessel and changed to young barnacles, such as are usually seen intermixed with grown specimens on rocks and stones at this season of the year. (*Balanus pusillus*, Penn.) In this stage the sutures between the valves of the shell and of the operculum were visible, and the movements of the arms of the animal within, although these last were not yet completely developed; the eyes also were still perceptible, although the principal part of the colouring matter appeared to have been thrown off with the exuvium (exuviæ). On the 10th another individual was seen *in the act of throwing off its shell*, and attaching itself as the others to the bottom of the glass. It only remains to add, that as the secretion of the calcareous matter goes on in the compartments destined for the valves of the shelly covering, the eyes gradually disappear, from the increasing opacity thence produced, and the visual ray is extinguished for the remainder of the animal's life; the arms at the same time acquire their usual ciliated appearance. Thus then an animal originally natatory and locomotive, and provided with a distinct organ of sight, becomes permanently and immovably fixed, and its optic apparatus obliterated, and furnishes not only a new and important physiological fact, but is the only instance in nature of so extraordinary a metamorphosis.'

'During the whole of the spring and summer months,' says Mr. Thompson, 'the water teems with these exuvia (exuviæ) of Tritones (the animal inhabitant, according to Linnæus, of the barnacles): it is impossible to avoid drawing up numbers every time a towing-net is thrown out, nay the tide is at times discoloured from their abundance; but to be certain that these are really such, let a stone with several barnacles upon it be kept in sea-water, regularly renewed, towards the latter end of April or the beginning of May, and with due attention many of them may be observed *in the act of throwing off exuvia* (exuviæ) in every respect identical; let it be recollected however that these are the casts of the *animal* alone, and not of the valves of the shell, or of the operculum.' Mr. G. B. Sowerby (*Genera of Shells*, 'Scalpellum') thus writes on the subject of Mr. Thompson's discovery:—'Without describing the facts, or entering upon the arguments with which he supports this opinion,' *i. e.* that the *Cirripedia* are *Crustacea*, 'we must be permitted to say that we do not think that he has fully demonstrated it; at the same time, considering that, as far as we hitherto know, the Cirripedes were all attached, the circumstance of their being free when very young accounts well to our mind for the fact of each species being found attached to peculiar situations, which would only be compatible with the notion of their being at one time free agents, and possessed of an instinctive volition determining their choice of situation.' Mr. Owen, in the 'Catalogue of the Museum of the College of Surgeons' (Cirripeda), speaks of the discovery without expressing any doubt.

But Mr. Thompson has since, in a paper read before the Royal Society on the 5th of March, 1835, declared his 'discovery of the metamorphosis in the second type of the Cirripedes; viz., the *Lepades*, completing the natural history of these singular animals, and confirming their affinity with the *Crustacea*.' and the memoir with a plate is published in the second part of the 'Philosophical Transactions for 1835.' The following is the abstract of the paper:—'The discoveries made by the author of the remarkable metamorphoses which the animals composing the first family of the Cirripedes, or *Balani*, undergo in the progress of their development, and which he has published in the third number of his "Zoological Researches" (p. 76), are in the present paper, which is intended as a prize essay for one of the royal medals, followed up by the report of his discovery of similar changes exhibited by three species of two other genera of the second tribe of this family, namely, the *Lepades*. The larvæ of this tribe, like those of the *Balani*, have the external appearance of bivalve monoculi, furnished with locomotive organs, in the form of three pairs of members; the most anterior of which are simple, and the other bifid. The back of the animal is covered by an ample shield, terminating anteriorly in two extended horns, and posteriorly in a single elongated spinous process. Thus they possess considerable powers of locomotion, which, with the assistance of an organ of vision, enable them to seek their future permanent place of residence. The author is led from his researches to the conclusion that the Cirripedes do not constitute, as modern naturalists have considered them, a distinct class of animals, but that they occupy a place intermediate between the *Crustacea decapoda*—with which the *Balani* have a marked affinity—and the *Crustacea entomostraca*, to which the *Lepades* are allied; and that they have no natural affinity with the testaceous mollusca, as was supposed by Linnæus, and all the older systematic writers on zoology.' *

Mr. Thompson does not seem to have been aware of a paper by Dr. J. Martin-Saint-Ange, read at the Academy of Sciences on the 14th July, 1834, and published in the 'Savans Etrangers,' tome vi., and separately by Baillière (1835). The following is the summary of the principal facts stated by him in the course of a very laborious and acute investigation. The mouth of the Pedunculated Cirripeds is composed of pieces entirely comparable to those of the mouth of many *Crustacea*, and especially of the *Phyllostomes*; the upper lip, the palpi, and the mandibles, are so analogous, that the resemblance extends even to the form. The three jaw-feet (*pieds-mâchoires*), which are met with most commonly in the Crustacea, are conjoined in a single jaw-foot which receives the nervous trunks; at its base are always found from two to four branchiæ. The ten ordinary feet of the Crustacea are faithfully represented in the *Anatifes* (Campylosomata); at the base of many among them are found branchiæ disposed like those of certain Crustacea, and the number even is sometimes repeated. There exists in each foot a double canal, fit for establishing a circulating current, and traversing all the articulations of the cirri. The body is composed of a

* M. Straus Durckheim claims the priority of referring the Cirripeds to the Crustacea, and would place them next to *Limnadia*.

certain number of rings, or of articulations, very distinct, each of which supports a pair of feet. In the interior of the body there are a dorsal vessel (like that in a great number of the articulated animals), and a double series of ganglions; of which the number, according to Dr. Martin-Saint-Ange's researches, is equal to that of the feet: there is besides another pair on the lateral parts of the stomach. The pedicle may be regarded as analogous to the tail of many Crustacea; it is in this cavity, and not, as has been said, on the back, that the eggs are found; these pass afterwards by a conduit, not yet indicated, in the envelope, which, by its resemblance to the mantle of the mollusca, establishes the only possible analogy between the Cirripeds and the last-named animals. The organs placed upon the back, which Cuvier described as eggs, are the generative apparatus of the male, of which the disposition is very remarkable. Finally, the stomach and intestinal canal enclose in the interior a membranous sac of a retort-shape; the disposition and use of which establish, according to the researches of M. Serres, an additional approximation between the Cirripeds and the Annelids. Dr. Martin-Saint-Ange then proposes as the last result of his labours, to place the class *Cirrhipeda* at the end of the *Crustacea*, so as to establish a natural link or passage between the superior articulated animals and the *Annelids*. Such are the conclusions drawn in the Memoir of Dr. Martin-Saint-Ange, who refers with approbation to the discoveries of Mr. Thompson, published in 1830; and before we proceed to the comments made on the Memoir of Dr. Martin-Saint-Ange, we will state Mr. Thompson's view of the ovarial system. 'In the whole of the tribe of the Cirripedes,' observes Mr. Thompson, in his paper in the 'Philosophical Transactions' above quoted, 'the ova, after expulsion from the ovarium, appear to be conveyed by the ovipositor into the cellular texture of the pedicle, just beneath the body of the animal, which they fill to the distance of about an inch. When first placed in this situation, they seem to be amorphous and inseparable from the pulpy substance in which they are imbedded; but as they approach to maturity they become of an oval shape, pointed at both ends, and are easily detached. Sir Everard Home has given a very good representation of them, at this stage of their progress, in his 'Lectures on Comparative Anatomy,' from the elegant pencil of Mr. Bauer. During the stay of the ova in the pedicle, they render this part more opaque and of a bluish tint; the ova themselves, and the cellular texture with which they are surrounded, being of a pale or azure blue colour. It is difficult to conceive in what manner the ova are extricated from the situation above indicated; but it is certainly not by the means suggested by Sir Everard Home in the above-mentioned lecture, viz., by piercing outwards through the membranes of the pedicle, for the ova are subsequently found forming a pair of leaf-like expansions, placed between either side of the body of the animal and the lining membrane of the shells in *Lepas* (Pentalasmis), or of the leathery internal tunic in *Cineras*. These leaves have each a separate attachment at the sides of the animal to the septum, which divides the cavity occupied by the animal from that of the pedicle; they are at first comparatively small, have a rounded outline, and possess the same bluish colour which the ova had in the pedicle; but as the ova advance in progress these leaves extend in every dimension, and lap over each other on the back, passing through various lighter shades of colour into pale pink, and finally, when ready to hatch, become nearly white. These leaves appear to be composed of a layer of ova irregularly placed, and imbedded in a kind of parenchymatous texture, out of which they readily fall when about to hatch, on its substance being torn asunder; indeed it appears at length to become so tender as to fall entirely away, so that after the period of gestation is past no vestige of these leafy conceptacles is to be found. When the larvæ, barely visible to the naked eye, burst forth from the ova, their development goes on with such rapidity that they seem to grow sensibly while under observation. The larva of the *Lepades* then is a tailed *Monoculus*, with three pairs of members, the most anterior of which are simple, the others bifid, having its back covered with an ample shield, terminating anteriorly in two extended horns, and posteriorly in a single elongated spinous process.'

We now come to the report of MM. Duméril and Serres (drawn up by the latter) upon the Memoir of Dr. Martin-Saint-Ange. After adverting to the labours and views of Poli, Delle Chiaje, Home, Thompson, and Burmeister, the report states that the ganglionary nervous chain, pronounced by Cuvier to be single, has been found by Dr. Martin-Saint-Ange to be completely double: an important fact, more especially when it is compared with the duality of the nervous axis, which one of the reporters pointed out in the larvæ of insects and of certain Annelids, Hérold in the embryo of the Arachnids, Rathke in that of the crawfish, and MM. Audouin and Milne Edwards in many adult *Crustacea*. Thus, observe the reporters, the symmetry of the nervous system becomes a general rule, common to vertebrated and invertebrated animals. The remainder of this report is so interesting, and the reporters are such competent authority, that we find it necessary, for the better illustration of this obscure and long-debated subject, to give a portion of it, at least, as nearly as we can in the terms of the reporters:—'The author,' say they, 'has discovered besides in the Cirripedes a small nervous apparatus placed on the side of the head, which had its principal trunk in a tubercle which occupies this region. At first sight we thought that this tubercle might be the remains of the eye observed in the young state by Mr. Thompson, at the period when these animals are free, and that the nervous apparatus might be the remains of that of vision; but a dissection in water and under the microscope has not justified this opinion. Our researches however were made upon subjects which had been a long time in spirit; and it would be important to renew them on fresh individuals of various ages, in order to prove whether the loss of the eyes is complete and absolute, or whether, as Mr. Milne Edwards has observed in *Cymothöe*, the organs are hid in the thickness of the head, where they terminate by withering away and disappearing. After the nervous system, one of the most controverted questions about the organization of the Cirripedes is that relative to their genital apparatus, and the mode in which their generation is carried on. We do not stop at the idea of Home, who makes the Anatifes germinate from their pedicle, nearly like buds from a stem. This hypothesis, which is opposed by the disposition of the parts, is besides destroyed by the fact recently discovered by Mr. Thompson; viz., that of the primitive freedom of the Cirripedes. If at first these animals are free, if they move in all directions by the aid of their feet, which serve them as oars, it is clear that an hypothesis which supposes them to be adherent and fixed at all periods is unworthy of a serious refutation. It is not so with the opinion of Cuvier, which deserves to fix our attention; inasmuch as, if it were well founded, it would constitute a new species of hermaphroditism. On each side of the intestinal canal of the Anatifes is found a substance composed of an infinity of granules; these granules united in a bunch (*en grappe*) enter a hollow pedicle; this pedicle in its turn opens into a larger canal plaited in zigzag, which united to its congener is prolonged into the proboscidiform tube. According to Cuvier these granules and their bunches are the eggs and ovaries, the pedicles deferent canals, and the zigzag canal a sort of *vesicula seminalis*. On this hypothesis, the eggs detach themselves from the bunch and travel the length of the deferent canals and *vesicula semindlis*, becoming fecundated in their passage; they are finally deposited in the cavity of the mantle by the proboscidiform tube which terminates this apparatus: whence it results, according to Cuvier, that the same organic apparatus produces and fecundates the eggs, a condition which would amount to the most simple development of animal generation. But according to M. Martin-Saint-Ange, the whole of this apparatus only constitutes the male organ; the female organ being found enclosed (*renfermé*) in the cavity of the pedicle by which the Anatifes fix themselves to the bodies that support them. This is a renovation of the opinion of Poli and Lamarck, which Cuvier disregarded, because the pedicle appeared to him to be completely closed on the side of the animal. To give to this opinion the positive character which belongs to anatomy, the author ought to have found a passage which would place the interior of the pedicle in communication with the cavity of the mantle where the eggs group themselves, in the form of a rounded plateau. This communication was in fact made known to him by the discovery of a small conduit, which runs from the root of the pedicle along the bottom of the single piece (*pièce impaire*) of the shell, and opens in the interior of the mantle opposite the point where the eggs are assembled. The existence of this oviduct was placed out of doubt in three manners: first, the eggs being of a beautiful azure blue in the

living animal, the author found them in the ovarial conduit, passing from the pedicle into the mantle; secondly, on blowing into the pedicle the mantle was raised like a bladder; thirdly, instead of air he injected a coloured size or varnish (*vernis*), and thus made the oviduct stand out nearly in the same manner as vessels which would, from their minuteness and delicacy, escape the observer without such preparation.' The reporters then enter into a detail of their own experiments, and confirm this opinion of M. Martin-Saint-Ange, as combining in its favour every degree of anatomical certainty. They acknowledge that it may be objected that the ovary, in this case, is isolated from the fecundating apparatus; but observe that in this point the Cirripeds are in the same condition as the *Lophyropoda*, whose eggs are confined in a separate pouch placed at the superior border of the shell. Besides, direct observation proves that the eggs, which are in the state of ovula in the pedicle, present in the mantle the first lineaments of the embryo; a fact which agrees with the modern researches into the ovology of the *vertebrata*. The determination of the ovary and the discovery of the oviduct, then, in the Cirripeds are new facts; which, in extricating these animals from the state of exception in which Cuvier had pla ed them, subject them to the common law of generation. On the other side they return into a condition of exception by a fact of another description, little resemblance to whi h is at present known in comparative anatomy; viz., the possession of a second intestine enclosed within the ordinary one.

This second canal, discovered by the author and named by him a cæcum, floats in the alimentary canal and almost equals it in length. It is closed at its lower extremity, while at its upper extremity, which is open and wide, it is dovetailed (enchâssé par des dentelures) into the areolar lacunæ of the anterior of the stomach. In this cæcum the aliments are deposited to undergo the necessary elaboration preparatory to nutrition, so that, according to the opinion of the reporters, this last cannot be performed except by endosmosis, or by a species of rumination which would empty the contents of the second canal into the first. The reporters observe that they know only one animal, the common earth-worm, among the Annolids which has a second intestine enclosed in the alimentary tube; and there is still a difference; for, in that Annelid, the supernumerary intestine is closed at both extremities: it is in fact a double cæcum, which has induced M. Charles Morren (who, after Willis, Home, and Carus, has occupied himself specially with its study) to name it *typhlosole*. The reporters, after some other observations, address themselves to the subject of the approximation which M. Martin-Saint-Ange establishes between the Cirripeds and the Annelids. Agreeing with the majority of zootomists, the author allows that, in the greater part of their characters, the Cirripeds belong to the class *Crustacea*. Discussing then the value of the differential characters, he thinks, with M. Duméril and M. de Blainville, that they ought to serve as a passage from one class to the other. But while M. de Blainville considers the Cirripeds as *Crustaceous mollusks*, the author regards them on the contrary as *Annelidian crustacea*, and founds this decision on the duality of the nervous system, on the rudimentary segmentation of the body, and on the presence of nervous ganglions at the centre of the lineary divisions. The reporters remark that the same dispositions of the nervous system exist partially in *Cymothöe* and in the *wood-louse* (oniscus), and entirely in *Phyllostoma* and *Talitrus*, without a thought on the part of MM. Andouin and Milne Edwards, who made them known, to approximate those Crustacea to the Annelids. The reporters then observe, that although it is very true, as M. Martin-Saint-Ange observes, that in the greatest number of Mollusks the nervous system is united in one or more masses whence the nerves radiate, there are others in which the central nervous system is double, *Hyalæa*, *Aplysia*, *Bulla aperta*, *Tritonia*, *Doris*, *Clio Borealis*, &c., for example, which shows, as remarked by M. Serres, that the nervous system of the *Invertebrata* cannot alone furnish a solid basis for the methodical distribution of those animals. Laying aside the nervous system, the secondary characters of the Cirripeds most in accordance with the bases of natural classification are the shell and the mantle; here they would incontestably approach the Mollusks, if these parts were analogous to those which envelop the latter. But according to Professor Burmeister they are entirely different, and bear more resemblance to the external covering of the *Crustacea* than to that of the *Mollusca*. Hence, observe the reporters, it results that the place which the Cirripeds ought to occupy is still undetermined;—they conclude with a eulogy on the multitude of new facts so clearly presented and perfectly illustrated by M. Martin-Saint-Ange in his memoir.

That the paper of Dr. Martin-Saint-Ange is deserving of much praise, and that his illustrations, some of which are here copied, are very good, there is no doubt; but we must be pardoned for saying a word or two as to some of the facts alleged to be new. In the first place we must not forget Professor Burmeister,* whose admirable labours on the subject no one can follow without advantage; and in the next, we do not quite understand the statement in the report that the ganglionary nervous chain pronounced by Cuvier to be single has been found by Dr. Martin-Saint-Ange to be completely double, and we beg to refer to the following passage in Cuvier's 'Mémoire sur les Animaux des Anatifes et des Balanes.' 'The nervous system of the Anatife is entirely similar to that of the articulated animals.' Cuvier then speaks of the brain, composed of four small lobes, placed upon the œsophagus, and giving off four principal nerves which proceed to the muscles and the viscera. 'The *two lateral cords*,' he continues, 'which form, as usual, a collar round the œsophagus, each give off a nerve; they then unite below by means of two ganglions, whence proceed the nerves of the first pair of feet: the *two cords then proceed* in parallel lines (parallélement), the length of the belly, between the bases of the feet, swelling from space to space into double ganglions, as in all the articulated animals, and giving off from each of these ganglions the nerves of the neighbouring parts.' And he gives a figure illustrative of the nervous system, and, among other portions,

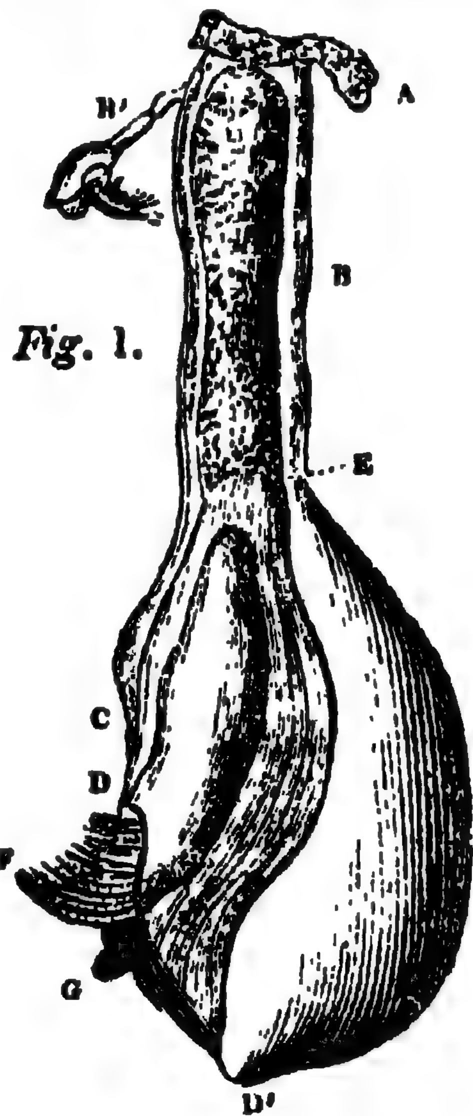


Fig. 1.

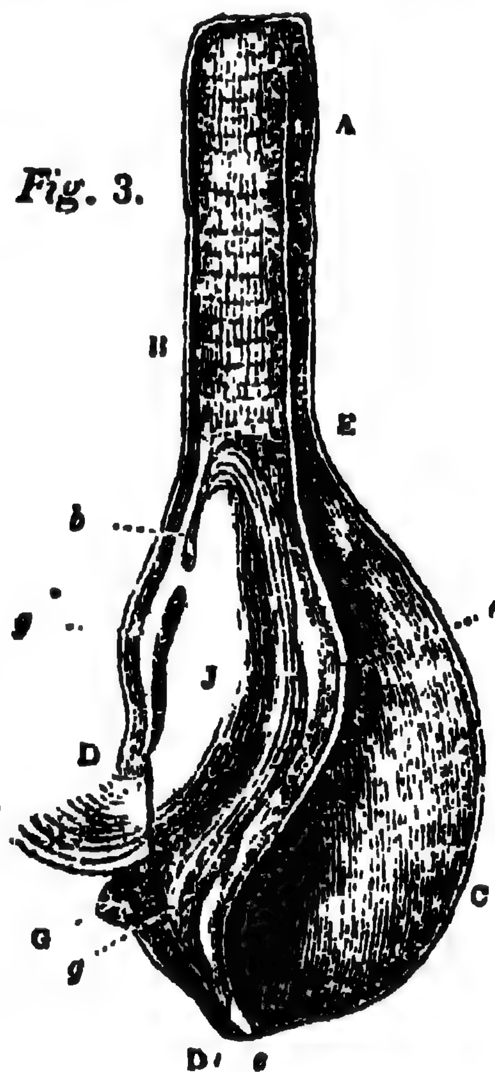


Fig. 3.

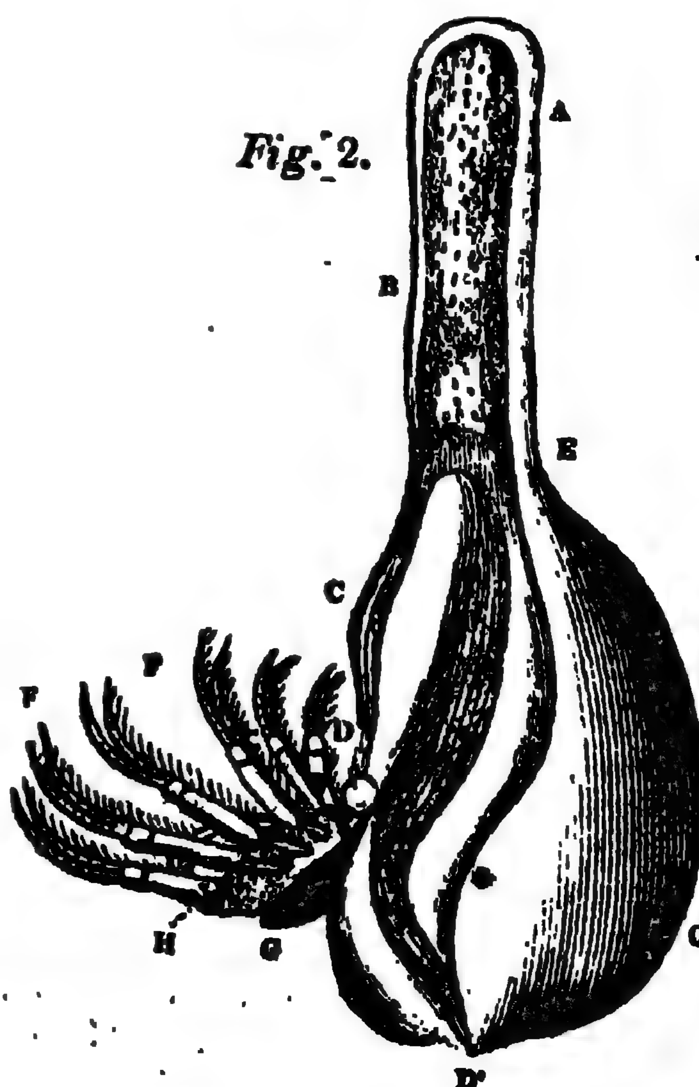


Fig. 2.

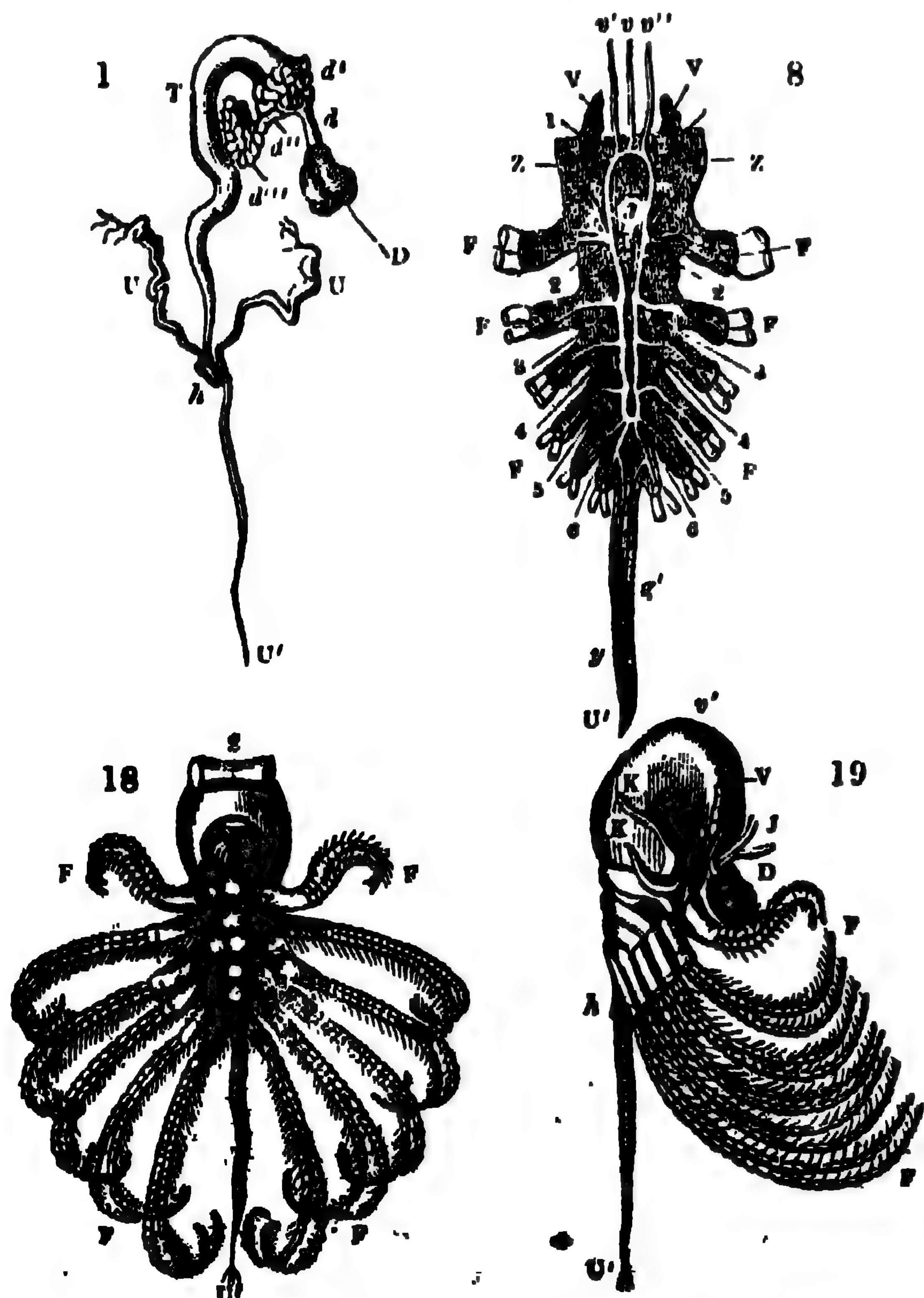


Fig. 4.

* Beiträge, 'Zur Naturgeschichte der Rankenfüsser,' Berlin, 1834.

of the Réunion des *deux cordons* lateraux, et premier ganglion. With regard to the internal cæcum floating in the alimentary canal, it should be borne in mind that the cuticular lining of the gizzard of the annelids is very easily separated. Among the annulose animals we know that when the common crab moults or changes its skin, it likewise casts the inner coat of the stomach.

1. Anatife jaune sans coquille, (Alepas?) A, a gelatinous production or continuation of the horny envelope which serves to fix the pedicle. B, the first membrane of the pedicle. B, a small anatife of the natural size developed upon the pedicle of the parent. C, the convex and swollen part which contains the body of the animal. D, the fissure of the horny envelope from which issue the feet or cirri, F. The point E indicates the termination of the pedicle and the place where the eggs stop. G, the eggs arrived within the mantle. 2. The same letters refer to the same parts as in figure 1. H, the part of the feet which sustains the cirri F. At the base of the feet (H) are four branchiæ; and between these feet and those placed on the other side is seen the recurved tube which serves to convey the seminal liquor within the mantle. 3. The same anatife, from which the half of the first envelope has been taken so as to expose the interior. The pedicle contains a second cylinder terminated in a cul de sac by its inferior extremity, and covered at the other by a very delicate membrane; the longitudinal and transverse muscular fibres may be observed. *e e* indicate the canal which carries the eggs of the pedicle within the mantle; *b*, that which serves as a nourishing vessel to the pedicle and the eggs; *g, g*, the membrane of the mantle which intercepts all direct communication between the pedicle and the cavity of the mantle. J represents the body of the anatife enclosed in its proper envelope. 4. The same situation as the last, representing all the membranes which envelop the body of the anatife. B B, the muscular cylindrical pipe open, in which the eggs are seen. *e, e*, the course of the oviduct in the thickness of the second envelope. *g, g, g*, the envelope opened and turned back. J, J, J, the proper membrane of the body of the animal; it is with this cavity that the canal *b* communicates, and it is between this proper membrane and that of the second envelope *g, g, g*, that the eggs are found: whence it results that the cavity of the mantle has no communication with the pedicle, except by means of the oviduct *e*.



19. A side view of the common duck barnacle (*Pentalasmis anatifera*) taken out of the shell, enveloped in its proper membrane, under which is found the salivary vesicle. V, the cervical ganglion. *v'*, the nerve which is given off from the brain to go to the muscles of the skin. J, the two levator muscles of the upper lip. K K, branchiæ. *h*, a horny tubercle which is formed on each side of the orifice of the vent. U', the extremity of the tube, bearded with fine hairs. 18. Anterior view of the same, showing the truly articulated disposition of the body, each ring of which corresponds to a pair of feet. S, the adductor muscle of the valves. U', the articulated tube which contains the spermatic canal. 1. The intestinal canal of the same species. (N. B. It is identical with that of the naked species above described.) D, the mouth seen from the side; *d*, the œsophagus; *d'*, the stomach; *d''*, the pedicle which makes this organ communicate with a species of cæcum, *d'''*, of the same structure and form as the stomach. T, the intestinal canal, offering two natural curvatures. *h*, orifice of the rectum. U U, vesiculæ seminales, uniting in a single canal very delicate, and terminated at U' by a small orifice. 8. Disposition of the nervous system. 1. The first œsophagian ganglion, called the brain: from these united ganglions spring the branches *v, v', v''*, destined for all the muscles of the dorsal part, and two extremely delicate threads which go on each side, the first to the salivary vesicle V, the second to a new ganglion Z. 2. The second ganglion, sending two nervous branches to each jaw-foot F, and small branches to the œsophagus. 3, 4, 5, 6 correspond to the other ganglions. 6 furnishes the two last pair of feet. It is from the branches which go to the last feet, and not from the ganglions themselves, that the two threads *y* and *g'*, which go to the extremity, U', of the tube are detached. The point *x* corresponds to the centre of the œsophagus which has been removed.*

For the fruits of Hunter's anatomical investigations in this class, the student is referred to the following numbers in the gallery of the Museum of the Royal College of Surgeons:—63, 64, 65, 582, 1011, 1012, 1013, 1014, 2298, 2299, 2300, 2302, 2303, 2810. Let him consult also Poli, ('Testacea utriusque Siciliæ;') Cuvier, ('Mémoires sur les Mollusques;') Sir E. Home, ('Lectures on Comparative Anatomy;') and Dr. Hermann Burmeister's valuable work above quoted.

Geographical Distribution.—The Cirripeds are widely spread, and scarcely any seas are without some of the species. Their habit of fixing themselves so frequently to floating bodies tends to their great diffusion, and, in addition to this propensity, almost every rock and submarine body is studded with some of them.

Arrangement.

Cirripedia.

Animal marine, more or less conical; sometimes compressed; enveloped in a sacciform mantle, open only on one side, swollen as it were at the anterior part, which, following the natural position of the animal, is the lower portion, terminated above by a certain number of pairs of long, horny, articulated, ciliated cirri, and curved at the summit. No distinct head, no eyes, and no true tentacula; the mouth furnished with lateral, horny, toothed and articulated jaws. Branchiæ situated on each side at the base of the first cirri; orifice of generation at the extremity of a fleshy tube raising itself from the midst of the last cirri; vent at the base of this tube.

Shell variable, but when present always composed of many valves, either soldered or not soldered together; no true shell in one case only, and in that instance a soft envelope in lieu of it; the shell or its representative adhering without intervention, or by the intervention of a fleshy peduncle which issues from the mantle.

Order 1.

Campylosomata.

Anatifa of Bruguières; Cirripèdes pédonculés of Lamarck; Anatifes of Férussac; Gymnodermes and Ostracodermes of Latreille; Lepadiens of De Blainville.

Animal oval, compressed; suspended in its shelly envelope, to which it adheres by a transverse muscle situated near the opening. Mantle open solely on one side, and inferiorly attaching itself to the edge of the shell, and prolonged on the other side into a contractile and fleshy pedicle, adhering by its extremity to submarine bodies; branchiæ pyramidal, adhering on the outside of the base of the cirri.

* The figures and descriptions are taken from Dr. Martin-Saint-Ange's Mémoir.

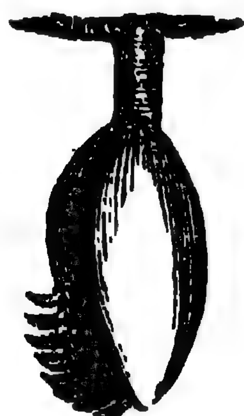
Shell.—Almost always composed of five principal pieces or valves, rarely without any vestige of these testaceous portions, but in that case replaced by a subcartilaginous and thick envelope; principal valves triangular, delicate, touching or overlapping each other at the edges; sometimes rudimentary, and in that case very much separated. The valves are thus disposed: two large lateral valves receiving the transverse muscle; beyond these two smaller lateral valves, and a mesial valve serving to join all together. There are often a number of accessory pieces fixed at the base.

Habits.—The genera of this order affix themselves by means of their pedicle to submarine bodies, forming numerous groups. They are often found on floating substances far at sea: on ships, on logs of timber, on bottles, on net-corks, on fuci, on floating testaceous mollusks, *Ianthina* for instance, and even on some of the vertebrated animals, on whales, turtles, and even serpents—*Hydrophis*, for example. Other testaceous mollusks might be mentioned, and one species has been found parasitical within the umbrella of a *Medusa*. A large log of timber covered with these animals, twisting and diverging in all directions, and so thick as entirely to hide the surface of the log, is a strange sight. They look like an enormous collection of serpents to the ignorant; and we have heard a living mass of this description casually thrown into shallow water and left by the tide, so termed. Their growth must be extremely rapid. A ship going out with a perfectly clean bottom will often return from a short voyage covered with them below the water line. The Blacks of Goree are said to eat a large species of *Pentalasmis*, which is stated to be delicate.

Genera, Alepas.

Animal oval, compressed, bean-shaped, rounded near the pedicle, which is moderately long. Cirri rather short, and hardly recurved at their summit.

Shell replaced by an entire subgelatinous and somewhat transparent envelope, without any other opening than that which serves for a passage to the cirri, continuing itself with the pedicle, and presenting no trace of testaceous pieces. Such is the description of Mr. Rang, who has given the generic appellation above stated to the *Cineras parasita* of Lesson, and the *Anatifa univalvis* of Quoy and Gaimard. The species on which the genus was founded was detected attached to the umbrella of a *medusa*. Rang considers this to be the *Triton* of Linnæus. Cuvier, in the last edition of the 'Règne Animal,' observes that he has not seen the species, but still adheres to his old opinion; for he says that it ought not, in any case, to be confounded with the *Triton* of Linnæus, which was the animal of an *Anatifa* torn from its mantle and shell. Rang thinks that this and the following genus connect the last family of the *Acephala* with the first of the *Cirripedia*.



[Alepas parasita.]*

Gymnolepas.

Otion and *Cineras*, Leach; *Aurifère*, De Blainville.

Animal compressed, with the cirri much recurved at their extremity. Mantle nearly entirely naked, thick and subcartilaginous. Pedicle long and thick.

Shell rudimentary, composed of small valves very much separated. Locality, probably warm climates. *Otion Cuvieri* has been received from Senegal; and there is a fine group on *Coronula diadema*, a parasite of the South Sea Whale, in the Museum of the College of Surgeons, Nat. Hist., No. 281.

a.

Two auriform tubes at the summit. (Genus, *Otion*, Leach; *Aurifère*, De Blainville.)

Example. *Gymnolepas Cuvieri*, *Otion Cuvieri*, *Lepas aurita*, Linn

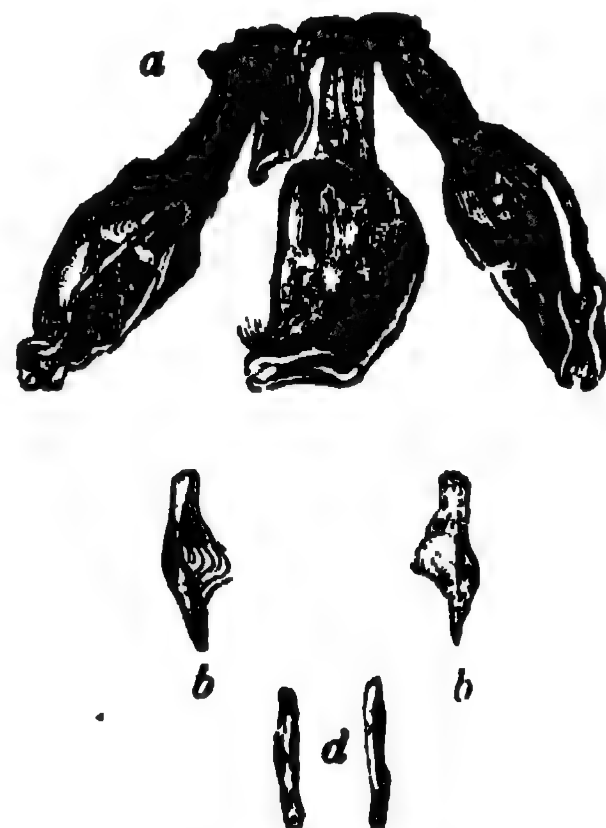
* From M. Rang's figure



[Gymnolepas Cuvieri.]

a, Gymnolepas Cuvieri; *b*, the lateral valves; *c*, the single valve; *d*, the terminal valves.

No auriform tubes form more angular. (*Cineras*, Leach.)



[Gymnolepas vittata.]

a, Gymnolepas vittata; *b*, the lateral valves; *c*, the single valve; *d*, the terminal valves.

The small valves in *Otion* were overlooked by Lamarck, but detected by Leach. In the Museum of the Royal College of Surgeons, Nat. Hist., No. 265, there is a species named *Cineras Hunteri*, of which two small groups are attached to the tail of *Hydrophis bicolor*, which is figured in Russell's 'Indian Serpents,' 1, tab. xli., and is called by the natives 'Nalla Wahlagillee Pam.' Russell says, 'This sea-snake, according to the Vizagapatam fishermen, seldom approaches the shore: several of them had never seen one before. They pretended it was of a very dangerous kind, which is contradicted by the want of poisonous organs.' See 'Catalogue of the Museum,' part iv., fasciculus 1; and 'Shaw's Lectures,' which are there quoted also.

Pentalasmis.

Anatifa, Bruguières and Lamarck; *Pentalepas*, De Blainville.

Animal compressed, enveloped in a very delicate mantle. Pedicle often very much elongated. Cirri curled at the summit. Locality, widely spread in most seas. Plentiful on the coast of Africa.

Shell subtriangular, formed of five distinct pieces completely enveloping the animal.

Example. *Pentalasmis anatifera*, *Anatifa lævis*, Lam.; *Lepas anatifera*, Linn. Duck-barnacle.



[Pentalasmis anatifera.]

Pollicipes.

Pentalepas of De Blainville.

Animal like that of *Pentalasmis*, but with a shorter pedicle, which is rough, somewhat like shagreen.

Shell triangular, composed, besides the principal side valves, of a number of accessory pieces fixed at their base. Locality, temperate and warm seas.

Example. *Pollicipes mitella*, Lamarck; *Anatifa mitella*, Bruguières; *Lepas mitella*, Linnæus.



[Pollicipes mitella.]

Scalpellum.

Polylepas of De Blainville.

Animal resembling that of *Pentalasmis*. Pedicle shorter and scaly.



[Scalpellum vulgare.]

Shell formed of thirteen pieces, completely covering the animal. Locality. Of the two species known, one is common in the European seas, and the other was found in the Straits of Magalhaens.

Example. *Scalpellum vulgare*, Leach; *Pollicipes scalpellum*, Lamarck; *Anatifa scalpellum*, Bruguières; and *Lepas scalpellum*, Linnæus.

Lithotrya.

Litholepas, De Blainville.

Animal compressed.

Shell irregularly subpyramidal, compressed, supported on a tubular, tendinous pedicle. Valves eight. At the base of the pedicle a shelly appendage, analogous to the testaceous base of *Acasta* and *Balanus*. Mr. G. B. Sowerby, who instituted the genus, considers it as intermediate between the sessile and pedunculated cirripeds; and states that it possesses a peculiarity not to be found in any hitherto described genus of this class, viz., that of penetrating stones for its habitation. Rang says, that De Blainville is of opinion that the genus is only a true *Anatifa* which had affixed itself upon the valve of a *Venerupis* at the bottom of one of the cavities which that bivalve hollows out for itself. De Blainville, in his 'Malacologie,' describes it under the name of Litholepas, sinking Sowerby's name altogether, though he says the genus was newly established by him, quotes his description, and merely states that he has never seen the cirriped. Whether it bores holes for itself or occupies those already hollowed out is doubtful.

Example. *Lithotrya dorsalis*, Sowerby. Locality, Montserrat, one of the Antilles.



[Lithotrya dorsalis.]

N.B. Cuvier gives a genus, *Tetralasmis*, which he describes as having but four valves surrounding the opening, two of which are longest. He says that the animal is in part contained in the pedicle, which is large and covered with hair. He considers these as a sort of Balani without a tube, and gives as an example *Tetralasmis hirsutus*. Cuv. 'Moll. Anatif.,' f. 14.

Order 2.

Acamptosomata.

Les Balanides of De Blainville; Cirripèdes sessiles of Lamarck; Balanes of Férussac; Quadrifères and Bifères of Latreille.

Animal conical, sometimes very much depressed, and sometimes nearly cylindrical; for the rest, similar to that of the preceding family, but without a pedicle, and having the branchiæ in form of two fringed wings attached to the internal surface of the mantle.

Shell thick, solid, variable in form, but nevertheless always conical or sub-cylindrical, adhering by its base to the surface of foreign bodies or penetrating within them, composed of a cone formed of one or more pieces united laterally, open at its base, or closed by a membranous or calcareous piece, serving for adhesion; always open at the summit, but furnished at this part with a pyramidal operculum, consisting of two or four valves.

This order was well known to the antients. The genera seem to have been all confounded under the name of βάλανος (Balanus) by the Greeks. (Aristotle, 'Hist. Anim.,' book iv., ch. 8, and book v., ch. 15.) Athenæus mentions them more than once; and (Deipnos, book iii., ch. 11, p. 88) speaks of the large ones with approbation as an article of food. They are the *Balani* of the Latins; nor did Lucullus disdain them. The Chinese eat the soft parts of one of the species (*Balanus tintinnabulum*), which has the reputation of being like the flesh of the lobster when cooked; and the delicious qualities of another species, and

its high estimation for the table, will be found under the article BALANUS.

M. Rang, whose arrangement we for the most part adopt, observes that many genera have been formed, some of which it may be necessary to disallow. The longitudinal tubular cavities with which the cone is pierced, and which open at the base, where they are said to be very sensible, are a distinguishing character of the order.

a. Cone univalve.

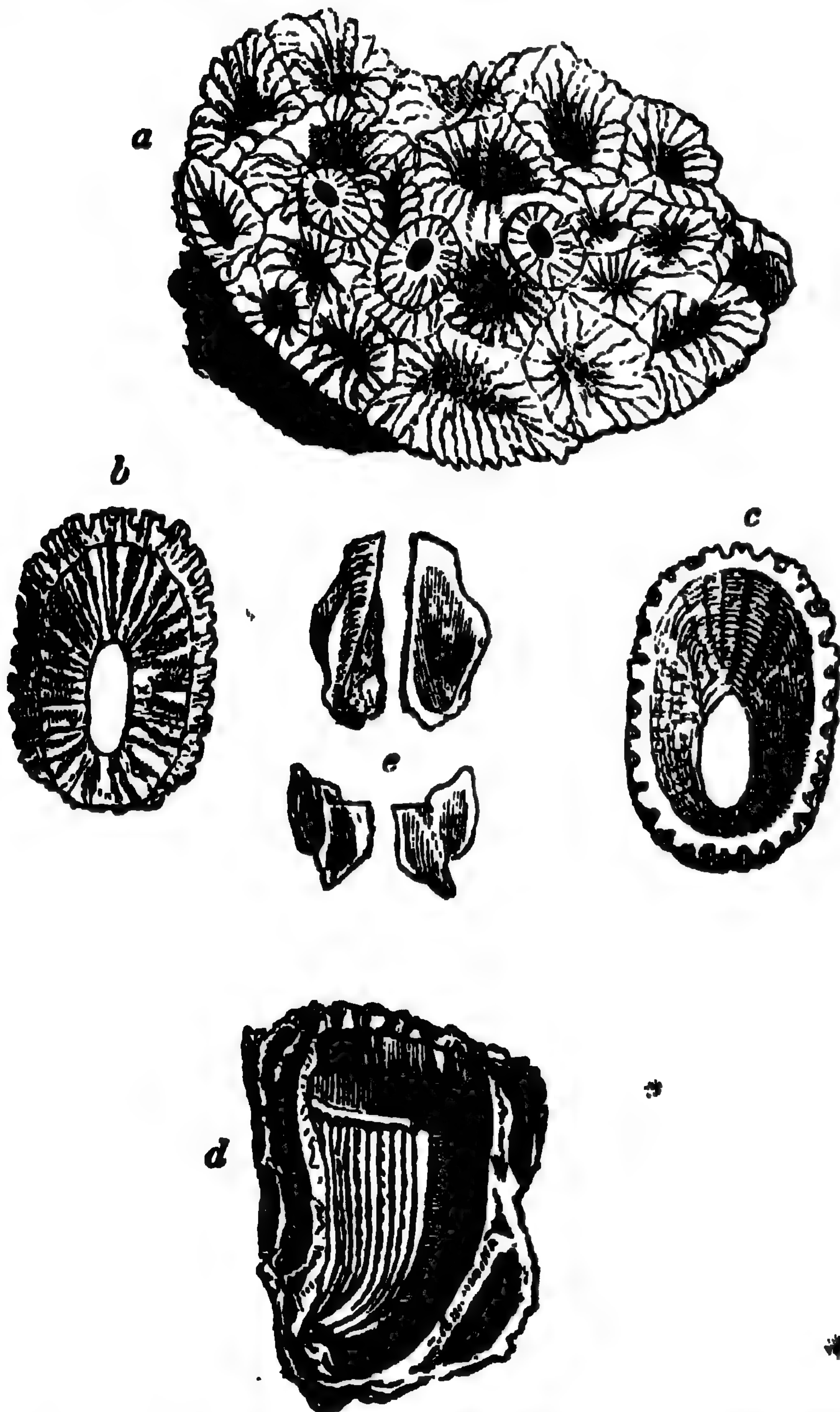
Genera, Pyrgoma. (Boscia of Férussac.)

Shell thick, generally compressed and somewhat conical, but sometimes regularly conical, open at the apex, and closed at the base by a deeply cup-shaped testaceous valve, striated or grooved perpendicularly in the inside; the operculum bipartite, each part composed of two valves, which are variable in form, the posterior one being in some species very much elongated (Sowerby).

Savigny appears to have instituted the genus, and Leach and Lamarck have adopted it: the former subsequently subdivided it into *Pyrgoma, Megatrema, Savignium* and *Adna.*

Habits. Either adherent on or penetrating into corals: in some cases entirely overgrown by them.

Example. *Pyrgoma crenatum.*



a, specimens of the natural size in Astræa favosa; *b, c, d*, different views and section of the cone; *e*, the opercular valves*; *b, c, d* and *e*, are magnified.

β. Cone quadrivalve.

* Operculum bivalve.

Clitia, Leach. (Verruca, Schum.? Ochthosia, Ranzani?)

Shell consisting of four irregular pieces, two larger and two smaller, dovetailed together by their dentated edges. Operculum bivalve, one piece irregularly quadrate, the other nearly triangular.

Example. *Clitia verruca, Lepas striata* of Pennant; *Lepas verruca* of Gmelin. Locality, British coasts.



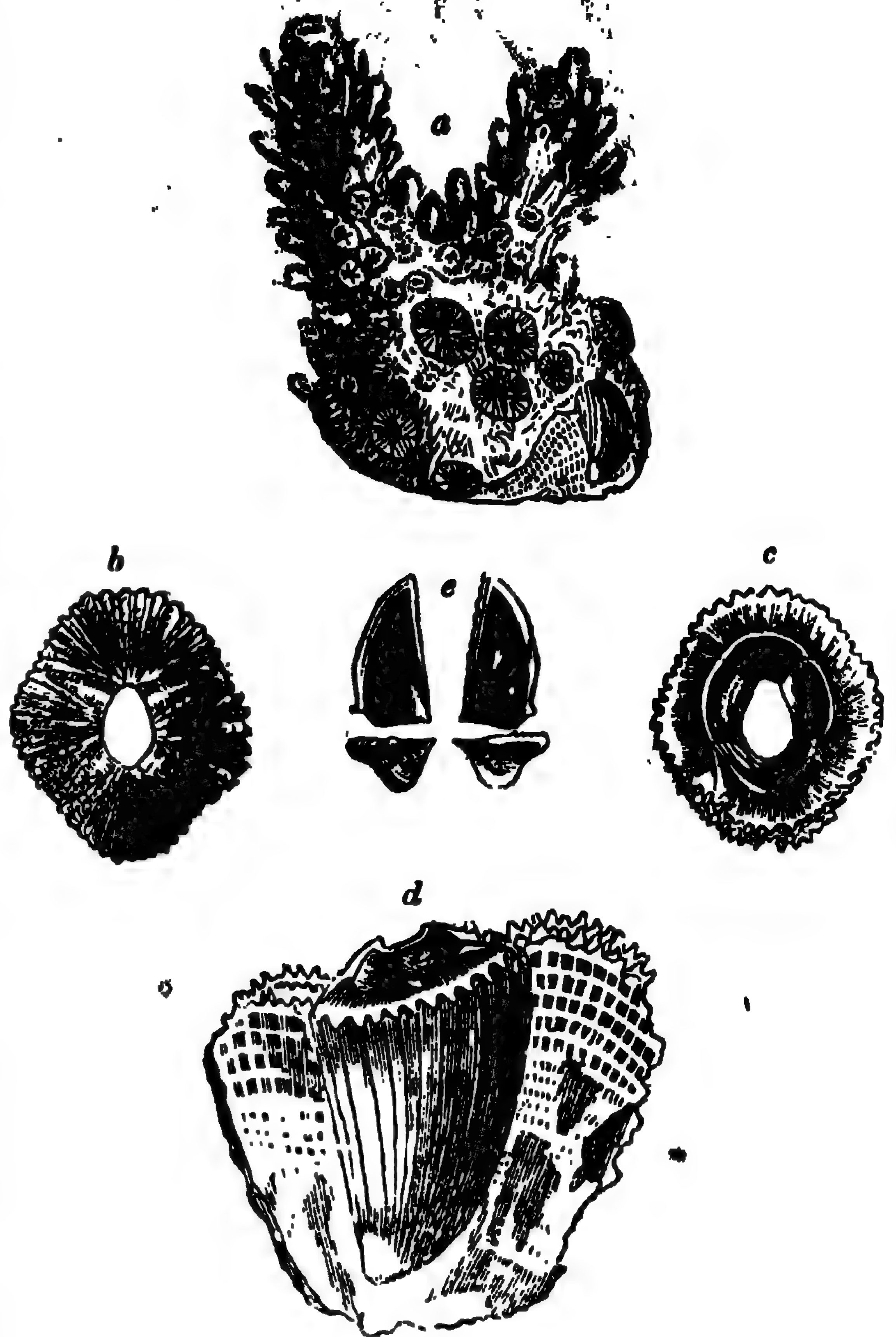
[Clitia verruca, enlarged.]

* The cuts of Pyrgoma, Clitia, Creusia, Catophragmus, and Octomeris, together with those of some of the detached valves of the Campylosomata, are taken from Mr. G. B. Sowerby's 'Genera of Recent and Fossil Shells,' where the reader will find much valuable information illustrated by engravings of great accuracy.

Creusia, Leach.

Shell somewhat flat, slightly conical, composed of four unequal valves; base deeply cup-shaped. Example, *Creusia gregarea*, Sowerby.

Habits. Like *Pyrgoma*, affixed to, or buried in, madrepores and other corals.



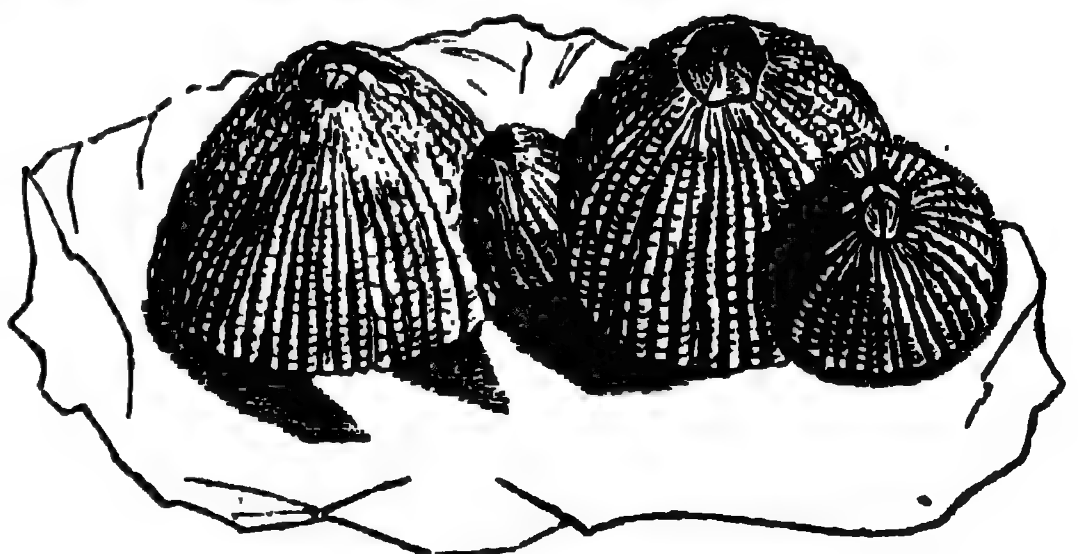
[Creusia gregarea.]

a, natural size in a madrepore; *b, c, d*, cone and section magnified; *e*, opercular valves magnified.

Conia, Leach.

(Azemus, or Asemus, Ranzani; Polytrema, Férussac.)

Shell subconical, composed of four subtriangular subequal valves; longitudinal tubes highly developed. Example, *Conia porosa.* Locality, Mediterranean, West Indian, and other seas.



[Conia porosa.]

γ. Cone with six valves.

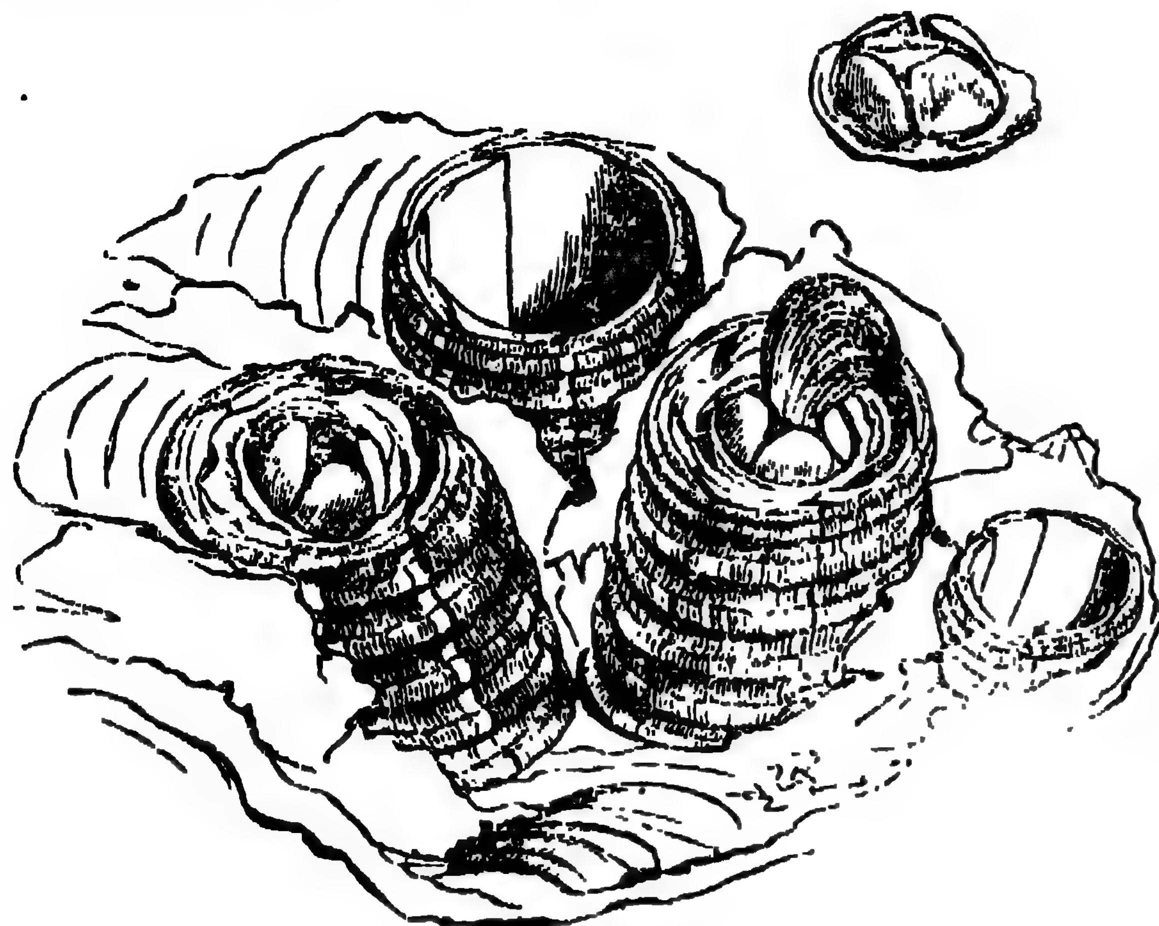
* Operculum composed of separate pieces, not articulated.

Tubicinella.

Shell subcylindrical; the cylinder, which is truncated at both ends, formed of six ligulate pieces, smooth within, but longitudinally striated and transversely ringed without, affording no bad representation of a portion of the windpipe in the vertebrata, closed beneath by a membrane.

Example, *Tubicinella balænarum*, Lamarck. The only species known.

Habits. Buried nearly up to the summit of the aperture in the skin and fat of whales, which are sometimes infested with it to an enormous extent.

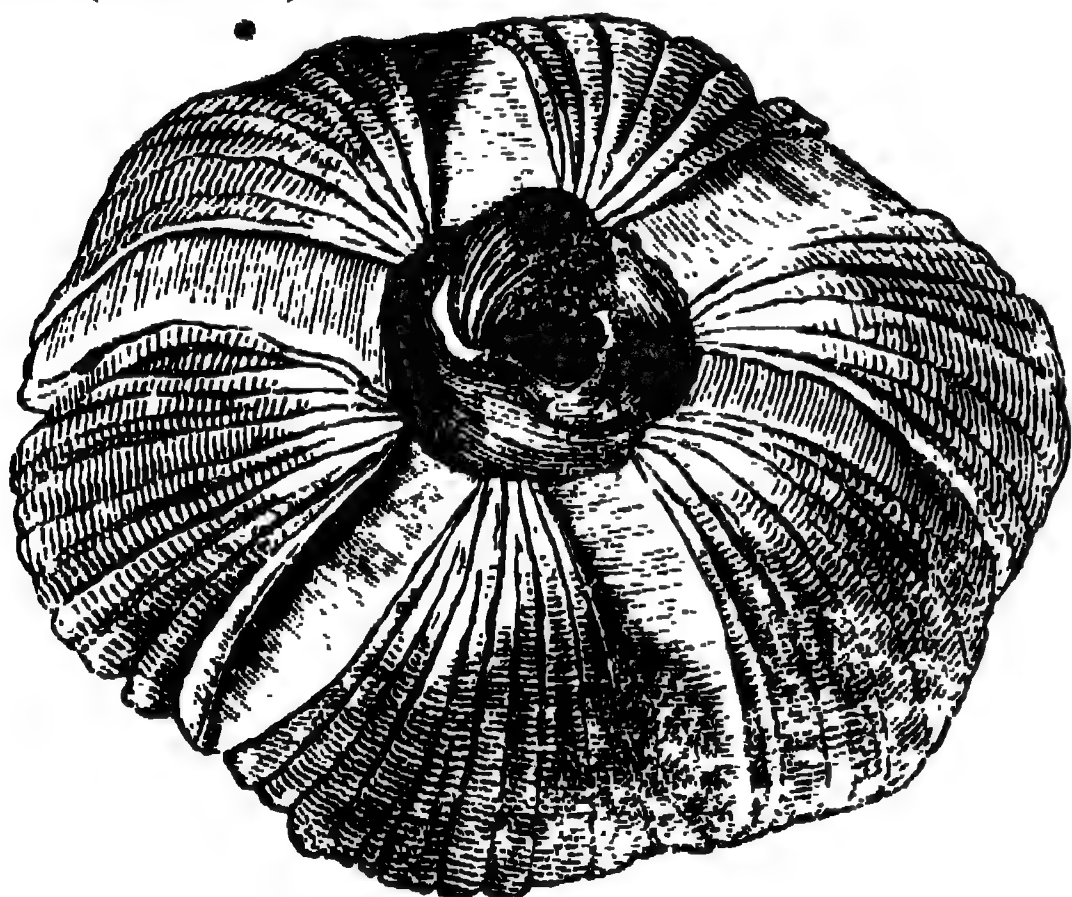


[Tubicinella balænarum.]

Coronula.

(Chelonobia, Leach; Cetopirus, Ranzani; Diadema, Schumacher.)

Shell suborbicular, subcylindrical, but generally obtusely, not to say flatly conical, constituted of six unequal ribbed pieces, so completely soldered as to bear the appearance of one; the lower side instead of longitudinal tubes presenting radiated cells in those species which infest the *Cetacea*. Example, *Coronula balænaris*. Locality, South Seas, imbedded in the skin and fat of whales. *Coronula testudinaria* (*Chelonobia* of Leach, &c.) adheres to the backs of turtles (*Cheloniæ*).



[Coronula balænaris.]*

* * Operculum quadrivalve, articulated.

Chthamalus.

A genus instituted by Ranzani; described as having a very depressed shell, with six pieces or valves, very thick at their base, and forming very regular rays; support membranous; aperture tetragonal, with almost equal sides; operculum subpyramidal. Locality, Mediterranean: most probably a part of Leach's Coniæ.



[Chthamalus stellatus.]

Balanus.

(See the article, vol. iii., p. 310.)

* The cirri are here represented as exserted; but they are capable of being withdrawn into the hood or collar formed by the opercular valves and intervening membrane for their protection. A most elaborate and beautiful illustration of the anatomy of the animal (Coronula Diadema) is given by Dr. Burmeister in the work above quoted, p. 34; pl. 2. There is a noble specimen (Coronula diadema), with a group of Gymnolepas Cuvieri attached to it, in the Museum of the College of Surgeons (Nat. Hist., in spirit, No. 281), and alluded to under 'Gymnolepas.'

Acasta.

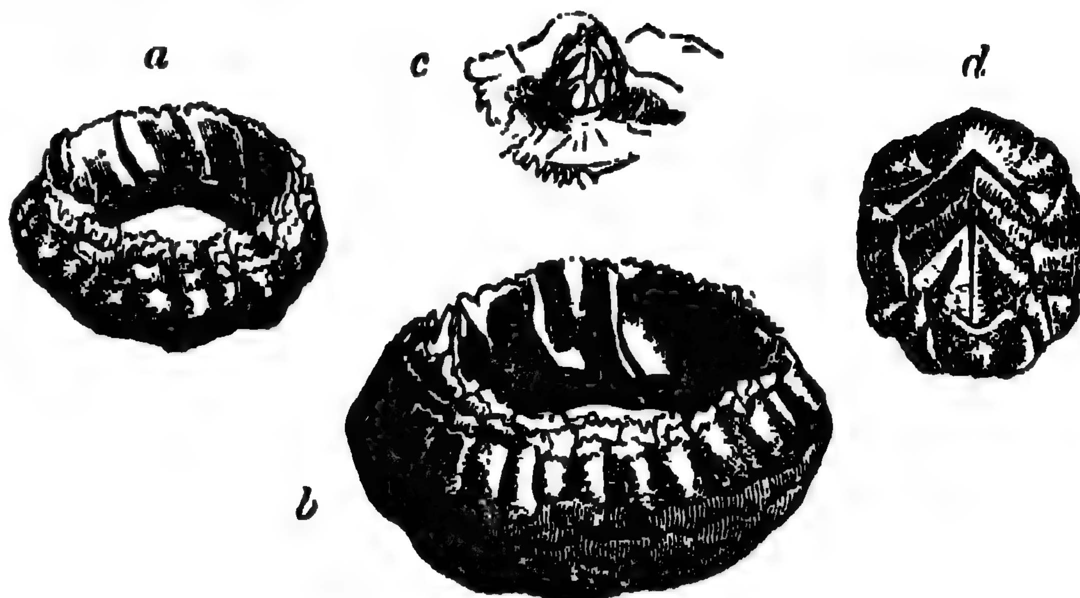
(See Balanus.)

δ Cone with eight valves.

* Operculum bivalve.

Catophragmus, Sowerby

Shell subconical, composed of eight unequal valves. There is a curious peculiarity about the genus. 'This,' says Mr. G. B. Sowerby, 'consists in a number of narrow perpendicular valves arranged around the shelly cone, and in rows, like pales, the first row of which consists of eight pieces, placed so as exactly to cover the sutures of the shelly cone immediately surrounding the animal; around this are then placed several sets of more and more numerous pieces gradually decreasing in size, so that the outer row, which is the most numerous, consists also of the smallest pieces. Additional rows seem to be produced as the animal increases in age; for a young specimen in our possession has only one row of eight pieces covering the sutures of the first cone, while a much larger and older specimen still retains part of three rows, and has evidently lost some of the external rows. The young individual also shows that the whole of the pieces are pointed at their superior extremities, whereas in the old shell these extremities are so worn or eroded as to become very irregular and obtuse.' Example, *Catophragmus imbricatus*, Sowerby. Locality, West Indies.



[Catophragmus imbricatus.]

a, the old shell, natural size; *b*, the same magnified; *c*, the young shell, natural size; *d*, the same magnified.

Octomeris, Sowerby



[Octomeris angulosa.]

a, the outside: below, an internal view of the eight divisions; *c*, the anterior piece; *d*, the posterior piece; *e* to *k*, the lateral pieces; *l*, the operculum, consisting of four pieces, of which the two anterior are the larger.

The genus rests on the following characters. Cone of eight pieces; internal sutures of the pieces or valves angular; shelly parts foliaceous; no internal plate; a thin epidermis. Example, *Octomeris angulosa*, Sowerby.

The student should examine the fine collection of Cirripeds in the British Museum, and he will find some good examples of the soft parts both of the Campylosomata and Acamptosomata in the Museum of the College of Surgeons, in the Natural History department (subjects preserved in spirit), numbers 258 to 282, both inclusive.

FOSSIL CIRRIPEDIA.

Pentalasmis. Mr. G. B. Sowerby says that fossil specimens of this genus are exceedingly uncommon; and adds, that he has never seen anything but fragments from two beds; viz., the Calcaire grossier of Grignon, and the Suffolk crag. [BALANUS.]

CIS, a genus of Coleopterous insects of the family Ptinidæ (Leach). They are minute beetles which infest the various species of Boleti. They are of an oblong, nearly cylindrical form, and generally of a brown colour: their tarsi are four-jointed, and the antennæ have the basal joint large, and the three apical joints forming a club. Fourteen species have been discovered in this country, the largest of which is scarcely one-eighth of an inch in length.

CISALPINE REPUBLIC. [BONAPARTE, p. 122.]

CISNEROS*, FRANCIS XIMENEZ DE, a celebrated statesman and patron of literature, a cardinal and primate of Spain, was born in 1437 at Torrelaguna in New Castile. He studied at a school at Alcala de Henares and at the university of Salamanca, and afterwards went to Rome, where he acquired such reputation, that Sixtus IV. promised him the first vacant prebend in the cathedral of Toledo; but the Archbishop of Toledo, vexed at this inroad on his patronage, and at the firmness with which Cisneros demanded it as his right, threw him into a dungeon. Being released at the end of six years, Cisneros went to Siguenza, where Cardinal Mendoza appointed him his grand vicar. In 1482, abandoning his brilliant prospects, he embraced the Franciscan rule. In 1492 Queen Isabella took him for her confessor, and in 1495 nominated him Archbishop of Toledo. This honour he declined with a firmness which nothing but the commands of the pope could overcome. In this exalted station he retained all his monastic severity. He constantly wore under the pontifical robes the coarse frock of St. Francis. In his travels he always endeavoured to lodge at some convent of his order, and he conformed to all the rules like an ordinary member. He set apart half of his enormous revenue (at that time amounting to 200,000 ducats) for the relief of the necessitous; and he made a daily distribution of provisions to thirty poor. He also expended considerable sums in the ransom of captives.

In 1498 Cisneros founded the University of Alcala de Henares, in which he provided for poor students, appointed a fund for prizes, and invited distinguished men from Paris, Bologna, Salamanca, and Valladolid. He instituted also a seminary for young ladies of respectable families who were destitute of fortune. Adjoining it he established a nunnery for those among them who chose to retire from the world: to the rest he allotted portions and disposed of them in marriage suitably to their condition.

In 1502 he undertook, assisted by eminent scholars, his Complutensian Polyglot, the type and the model of all subsequent ones. He sent to every quarter for MSS., and Leo X. obliged him with a communication of what he possessed. He collected seven copies in Hebrew at the expense of 4000 ducats, besides procuring from Rome a Greek MS., and from other quarters many Latin MSS.: not a single manuscript of this collection was of less antiquity than 800 years. The whole charge of the undertaking, which was completed in fifteen years, amounted to the immense sum of 50,000 ducats.

On the death of Queen Isabella in 1504, as all parties strove to attach Cisneros to their interest, he became the arbitrator between King Ferdinand and the Archduke Philip, the husband of Joanna, heiress of the crown. On the death of Philip, two years after, Cisneros was appointed regent on account of the incapacity of Joanna and the absence of Ferdinand. This was a critical moment for him, but his prudence overcame all difficulties, and kept all parties in check. He levied troops at the public expense, totally independent of the grandees, from whose hands he succeeded at last in rescuing the crown. He thus began, perhaps unconsciously, to vindicate the rights of the people against the nobility in Europe. By the feudal system, the military power was lodged in the hands of the nobles, and men of inferior condition were called into the field as their vassals. A king with scanty revenues therefore depended on them in all his operations. In 1507 Julius II. gave him the cardinal's hat. In 1508 the septuagenarian cardinal set off from Malaga at the head of 10,000 foot and 4000 horse for the conquest of Oran, a splendid city on the coast of Africa, which he added to the Spanish dominions at his own expense.

When Leo X., in order to raise money to complete the church of St. Peter, proposed to sell dispensations, Cisneros opposed the introduction of the pope's bulls into his diocese. On another occasion, as a primate of Spain, he prevailed on the king to exclude all bulls but what had received the sanction of the royal council; and ever since that time this salutary advice has been acted upon in Spain. At another time he opposed a claim of the same pope to the tenth of ecclesiastical benefices, and obliged him to be content with a tax of a tenth upon the clergy of the States of the Church.

Ferdinand at his death, 23rd January, 1516, left Cardinal Cisneros regent till the arrival of his grandson, Charles I. of Spain, afterwards Charles V. of Germany. The Dean of Louvain (afterwards Pope Adrian VI.) opposed this nomination. Cisneros however consented to admit him into the administration, and chose Madrid for his residence, that he might be more independent of the nobility, and better able to control their factions. He viewed with contempt the libels which were published against him, and always refused to inquire after the authors. The grandees objected to the power of Ferdinand to confer the regency, himself being only a regent, as the widower of Isabella; and the letter of Charles, which Cisneros showed them in ratification of Ferdinand's will, they treated as a mere matter of form. To satisfy their objections at once, the cardinal coolly requested them to wait upon him. From a balcony he showed them 2000 men in array, with a formidable train of artillery, which he ordered to be discharged. 'There,' said he, raising his voice, 'are the powers which I have received from his Majesty, and in a word *hæc est ultima ratio regum*.'

John Albret, the dispossessed king of Navarre, supported by some of the grandees, was forming a scheme to recover his kingdom. Cisneros, who had foreseen the danger long before, ordered a powerful body of troops to enter Navarre, and completely frustrated the attempt. To secure Navarre, he caused its numerous and expensive fortresses to be demolished, except Pampeluna, which he strengthened. To this precaution Spain is indebted for the preservation of Navarre. The French since that time have often overrun the open country, but not finding the former places of retreat and defence, they have been obliged to abandon it. In order to pay the debts of Ferdinand and the officers of his new militia, and to establish numerous and well-furnished magazines, Cisneros boldly undertook the abolition of unnecessary pensions, and enforced the restitution of many extensive crown demesnes, which had been alienated chiefly to the nobility in the late reign. He did not spare his dearest friends, nor even men of learning. The historian Peter Martyr of Anghierra and Gonzalez Oviedo suffered with the rest, and in revenge have defamed the cardinal's character.

While Charles remained in Flanders, every pretender to favour resorted thither, but nothing could be obtained without pecuniary application to his favourite Chièvres. Great sums were drawn out of Spain, and everything was disposed of to the highest bidder. The inferior officers followed the example of their head, and this infamous traffic became general. On the other hand, seeing Flanders on the eve of becoming a distant province of a vast monarchy, the Flemish ministers detained the king as long as they could, spreading all the time delusive reports of his instant departure, and cheating the cardinal under the pretext of defraying the expense of the king's voyage. When after twenty months of entreaties Cisneros prevailed

* He derived this surname from his family having been long established at Cisneros, in the province of Leon. The Spaniards generally call him Cardinal Cisneros; but in biographical and other works he goes under the name of Ximenez. He must not be confounded with Roderic Ximenes, a previous archbishop of Toledo, who is the author of 'Rerum in Hispania gestarum Chronicon,' and of 'Hispania Arabum.'

on Charles to embark for Spain, and was himself proceeding towards the coast to meet him, he was seized with a violent disorder, at the convent of Bozeguillas, near Aranda de Duero, which was attributed to poison. The Spanish grandees and Flemish courtiers now regulated the advance of the court by the probable extent of the cardinal's life. Weakened by disease, fatigue, and austerities, he still directed, to the great vexation of the courtiers, the helm of state, and seemed to survive only to evince his greatness of soul unimpaired by bodily suffering. Under pretext of giving time to the towns for preparing the honours due to the king, they succeeded in deferring his entry into Castile till the cardinal's death, which happened on the 8th of November, 1517, but not before Charles, whose pride was worked upon by his flatterers, had written, to his eternal shame, a letter to the great Cisneros signifying to him his dismissal. Thus was a virtuous man, upon the verge of finishing his mortal career, after having governed Spain for twenty years, and accomplished all that could be done for her greatness and tranquillity, and for the increase too of the royal prerogative—thus was an illustrious statesman rewarded by a prince who was indebted to him for the very foundation of his future power. Among the great men who have admired Cisneros, the name of Leibnitz should be mentioned. The rare union of calmness, firmness and decision in Cisneros, is well shown in Gometius (Gomez de Castro), 'De Rebus gestis à Francisco Ximenio;' in Marsollier, Flechier, Moreri, and Robertson.

CISS'AMPELOS PAREIRA, the Pareira-brava, a native of several of the West Indian Islands, of New Spain, and of Brazil. The root of this plant arrives in Europe in pieces from two to three feet long, varying in thickness from that of a finger to an arm, curved, furrowed, and warty, with a thin closely-adhering bark of a greyish-brown colour. The woody part is tough, but so porous that air can be blown from one end to the other of a long piece; the concentric circles are very conspicuous; the axis is not in the centre. The odour is very faint, but the taste is at first sweetish or liquorice-like, afterwards nauseous and bitter. Analysed by Feneuille it was found to consist of—

Soft resin; a yellow bitter principle (tonic); a brown principle; animalized matter, starch, malate of lime, nitrate of potash, and other salts.

The juice of the fresh plant in its native country is said to be a very efficacious application to the bites of serpents; but in Europe the root is employed only as a tonic diuretic. It is particularly valuable in cases where there is a copious discharge of urine with a ropy alkaline mucus. (Brodie's *Lectures on Diseases of the Urinary Organs.*) It is also serviceable in catarrhus vesicæ, and other affections of the urino-genital organs.

There is great reason to believe that the roots of several different species of this or closely-allied genera are confounded under the name of Pareira-brava, especially the root of Cissampelos Caapeba, also of C. Mauritanica (Aubl.), C. parroides (Decand.), which is much esteemed in the East Indies given along with aromatics in diseases of the intestines. Two species of Aleuta, A. rufescens (Aub.) and A. candicans (Decand.), are used in Guyana.

The Pareira-brava contains so much mucilage that it coagulates water in which it is put to infuse. A syrup of this plant is a valuable demulcent in phthisis pulmonalis, or consumption.

CISSOID (κισσο-ειδης, resembling ivy), a name given to a curve first considered by Diocles (an Alexandrian, and posterior to Pappus, as is supposed from the latter not mentioning the name of Diocles among those who invented methods for inserting two mean proportionals (*Math. Coll.*, book iii. prop. 5), which rises towards an asymptote, and then obtained its fanciful name. It was one of the curves employed by the Greeks in the celebrated problem of finding two mean proportionals, and is described as follows:—Let two points (A) and (B) move with equal velocities round a circle, setting out from the ends of a diameter in opposite directions of rotation. Let a straight line (P) always pass through the starting point of (A), and through (B) as it moves; and let an ordinate (Q) perpendicular to the line joining the two starting points always pass through (A) as it moves. Then the intersection of (P) and (Q) traces out the cissoid, which has the line joining the starting points for its tangent at the commencement, and the tangent to the circle passing through the starting point of (B) for its asymptote.

But the term cissoid has been applied in later times to all curves described in a similar manner, and where the generating curve is not a circle. The cissoid of the Greeks should then be called either the cissoid of Diocles or the circular cissoid. The starting point of (A) being the origin, the line joining the starting points the axis of x, and a the radius of the circle, the equation of the cissoid of Diocles is—

$$y^2 = x^3 \div (2a - x)$$

CISSOPIS. [BETHYLUS.]

CISTA'CEÆ, a natural order of Polypetalous exogens, belonging to the Calycose group; among which they are known by their opposite or alternate undivided leaves, generally strongly impregnated with a fragrant resinous secretion, regular flowers having crumpled petals and indefinite stamens, and fruit with parietal placentæ; a simple style, and a large number of seeds containing in the midst of albumen an embryo with the radicle remote from the hilum. They are remarkable for the beauty of their fugitive flowers in the genera Cistus and Helianthemum. The species of the genus Cistus are all natives of the southern countries of Europe, where the summers are hot and dry, however severe the winters may be. They flourish upon rocky places, which they perfume with their fragrant leaves. Cistus creticus and some other purple-flowered species produce the substance called Gum Labdanum.



[Cistus creticus.]

CISTE'LIDES, a family of Coleopterous insects of the section Heteromera and subsection Stenelytra. Technical characters:—Claws of the tarsi pectinated beneath; antennæ with the basal joint free, *i. e.*, not covered by a projecting portion of the head; mandibles with the apex entire.

This family includes the genera *Lystronichus*, *Cistela*, *Mycetocharus*, *Allecula*, and some others.

Lystronichus.—Of this genus there are upwards of thirty species known; their colouring is for the most part brilliant and metallic; by far the greater portion of them are found in South America. They have the thorax depressed, and with the posterior part as wide as the elytra, or nearly so; the antennæ are filiform, sometimes growing slightly thicker towards the apex.

Cistela.—The characters of this genus are:—Head long and somewhat pointed in front; labrum in width and length nearly equal; antennæ rather long, sometimes serrated, or

with most of the joints triangular; body elongate-ovate; thorax broader behind than before.

Nearly forty species of this genus are known, most of which inhabit Europe, and four or five are found in this country.

Cistela Ceramboides is nearly half an inch in length; black with ochre-coloured elytra, and, like most of the insects of this section, is found in flowers.

Cistela sulphurea (Allecula sulphurea of some authors) is about one-third of an inch in length, and its colour is pale-yellow throughout. This species is more common in this country than the last, and appears to be confined chiefly to the sea coast, where, like the one above mentioned, it is found in flowers.

Mycetocharus.—In this genus the head is short and rounded, and the labrum is transverse; the antennæ are shorter, and the body is more elongate than in Cistela. About ten species are known, most of which inhabit Europe and North America; but one is found in England (Mycetocharus scapularis); this is about three-sixteenths of an inch in length; black; the elytra with two orange-coloured spots at the base; the base of the antennæ and the tibiæ and tarsi are yellow.

The larva of this insect, together with those of one or two other species of the Cistelides, are figured in the first volume of the Entomological Society's Transactions, where an account of their habits will also be found.

The genus *Allecula* (Latreille) may be distinguished from either of the foregoing genera by the species having the penultimate joint of the tarsi bilobed, and the terminal joint of the palpi securiform.

Upwards of thirty species of Allecula have been discovered, most of which inhabit South America.

CISTERCIANS. [BERNARDINES.]

CITADEL (remotely from the Latin *civitas*, and immediately from the Italian *cittadillo*), a fortified post within or adjoining a town. It serves either to keep the inhabitants in subjection, or as a place of retreat for the garrison when compelled to abandon the town to an enemy. A citadel should be constructed in a situation where it may be easily succoured; its fortifications should be stronger than those of the town, in order that the enemy may be induced to attack the latter first; and it should be separated from the buildings of the town by an esplanade.

CITEAUX, or, as it was formerly written, CISTEAUX (in Latin, CISTERCIUM), the site of a celebrated abbey in the department of Côte d'Or, in France: it is about four miles E. from the town of Nuys, which lies on the road from Dijon to Châlons sur Saône. This abbey owed its origin to Robert, Abbot of Molême, of the order of St. Benedict, who, wishing to lead a stricter life, obtained permission of the pope to break the vows which he had made as a Benedictine, and to take upon himself others of a severer character. Accompanied by twenty-one monks, he retired to the forest of Citeaux, in the diocese of Châlons, and having obtained a grant of land of Reynard, viscount of Beaune (or, according to some, of the bishop of Châlons), and cleared the ground, he laid the foundations of the abbey and church. The abbey is said to have been of wood. Robert was elected abbot of the new community, which had not at first any new rule, but strictly observed that of the Benedictines. After a time, Robert was directed by the pope to return to his charge at Molême, where the disorders which had probably caused his retirement had proceeded to a great length. The third abbot of Citeaux was Etienne or Stephen Harding, an Englishman (canonized as St. Etienne), who may be regarded as the real founder of the Cistercian order (les Citeaux), as until his time no establishment had sprung from this monastery: in 1113-1115 were founded the first four establishments of which this can be regarded as the parent.

The monks of this order have been sometimes called Bernardines, from St. Bernard, one of the promoters of the order, and sometimes White Monks, from their habit, a white cassock with a white gown for attending the church, but a black one when they went abroad. The abbey of Citeaux was a very rich establishment previous to the Revolution; their revenue, according to Expilly, was about 110,000 livres or francs (above 4000*l.*), and the extent and imposing appearance of the buildings were indicative of its rank as the chief house of a monastic order. The community consisted usually of about 80 monks, beside 40 domestics. The church and a chapel under the portico contained the tombs of about 60 princes of the ducal house of Bourgogne, who made this their chief burial-place. Among those who have been inmates of this house, are St. Bernard and the four popes, Eugenius III., Gregory VIII., Celestine IV., and Benedict XII. The church and monastery have been destroyed, and there are now but few remains.

CITHARA, an antient stringed instrument of the lyre kind. That the names of the comparatively modern instruments, the gittern, or cittern, and guitar, are derived from the name of the Greek instrument (κιθάρα), we can have no doubt; and it is reasonable to infer, not only from similarity of appellation, but from the remains of antique art, that the modern instruments in many respects resemble that of the antients.

CITHARINUS, a genus of fishes of the salmon tribe (*Salmonidæ*), which inhabit the Nile. These fishes are chiefly distinguished from their allies by the depressed muzzle, the upper margin of the mouth being formed of the intermaxillary bones, the maxillaries being very small. The tongue and palate are smooth; the adipose fin is covered with small scales as well as the greater portion of the caudal fin.

CITOLE, a musical instrument mentioned in the *Confessio Amantis* of Gower, which was, Sir John Hawkins conjectures, a dulcimer.

CITRENE. The volatile oil of lemons consists almost entirely of a peculiar carburetted hydrogen, to which the name of citrene has been given.

CITRIC ACID. This acid is contained in several fruits, but in the largest quantity in limes and lemons. It was first procured in the state of crystals by Scheele. It may be obtained by the following process: to a gallon of lemon-juice made hot, add gradually 10oz. of chalk reduced to fine powder; set the mixture aside, that the precipitate, which consists of citric acid and lime, or citrate of lime, may subside. Wash this frequently with warm water, and then mix with it 10 ounces by weight of sulphuric acid previously diluted with 7 pints of water; boil the mixture for a quarter of an hour; press the residue strongly in a cloth, and evaporate the strained liquor with a gentle heat so that crystals may be formed. These crystals are to be rendered pure by repeated solution in water and recrystallization.

In this process the malic acid, gum, and extractive matter of the lemon juice, which prevent the acid from being obtained pure by mere evaporation, remain in solution, while the citrate of lime is precipitated, which being decomposed by the sulphuric acid, sulphate of lime is formed, and remains insoluble, while the citric acid, nearly pure, remains in solution and crystallizes by evaporation.

The properties of citric acid are, that it is colourless, inodorous, extremely sour; the primary form of the crystal is a right rhombic prism, subject to numerous variations. These crystals suffer no change by exposure to air under common circumstances; when heated to little below 212° they melt in their water of crystallization, and without losing any weight they concrete on cooling into a hard transparent mass. At a little greater heat they decompose. One hundred parts of the crystals are dissolved by 75 of cold and 50 of hot water: the solution reddens litmus strongly; decomposes by keeping; they are slightly soluble in alcohol.

Citric acid consists of

4 equivalents of	oxygen	32	or	55·18
2 „	hydrogen	2		3·44
4 „	carbon	24		41·38
Equivalent		58		100

The crystals, obtained as above mentioned by the cooling of a saturated solution, consist of

1 equivalent of	dry acid	58
2 „	water	9
		67

When the solution from which the above-described crystals have been obtained by cooling is subjected to spontaneous evaporation, the acid is procured in a different crystalline form, the crystals consisting of 3 equivalents of dry acid and 4 of water, half of which is expelled at a temperature of about 80° Fahrenheit.

When citric acid is decomposed by heat it yields a peculiar acid, called pyrocitric acid, a spirituous liquor analogous to pyroxylic spirit, and an oily matter, which by the

long contact of water is converted into the two preceding substances, acetic acid, water, carbonic acid, carburetted hydrogen, and a coaly residue.

Citric acid is used as a discharge in calico printing, and as a substitute for lemon juice in making saline draughts, and in making effervescing lemonade with the sesquicarbonate of soda: tartaric acid, sometimes substituted for it on account of its cheapness, is less agreeable, and has the inconvenience of forming a purgative salt with the soda.

Citric acid combines with different bases to form citrates, but during its combination with them it is very apt to undergo change of composition.

Citrate of Ammonia is a very soluble salt, and does not crystallize till the solution is evaporated almost to the consistence of honey.

Citrate of Potash is a deliquescent salt.

Citrate of Soda crystallizes in prisms; it is slightly efflorescent, and soluble in three-fourths its weight of water: it fuses before decomposition.

Citrate of Lime, as already mentioned, is very slightly soluble in water, requiring about 500 times its weight; it is rendered more soluble by excess of acid. Citrate of magnesia is soluble, but the citrates of barytes and strontia are insoluble.

Of the metallic citrates, those of iron are soluble, that of zinc slightly so; those of copper, silver, and lead, are insoluble: no citrate whatever is applied to any use, except the solution of citrate of potash, extemporaneously prepared as antifebrile medicine.

CITRON. [CITRUS.]

CITRUS, a genus of Aurantiaceous plants, one of whose species yields the orange, another the lemon, and others the citron, shaddock, lime, and similar fruits. Among the other genera of the natural order to which it belongs, it is known by its stamens being numerous and irregularly combined into several parcels, and by its fruit having a leathery rind which can be easily separated from the pulpy part that lies beneath.

It is a common opinion that the golden apples of the Hesperides were the fruit of some species of this genus, but as the gardens of these fabulous personages were stationed, according to the most approved opinions, either among the mountains of Atlas or to the west of them, there is no probability that the opinion alluded to is correct; for independently of the historical facts that citrons and lemons at least were obtained from the Persians, it is certain from the researches of Wallich and other Indian botanists that it is among the lower ranges of hills in Nepal, and most probably in China also, that the wild states of the Citrus genus find a home. It is added that the sweet orange itself comes from the southern provinces of China and the Malayan Archipelago, but it is by no means clear that the plant in those countries is really wild; it is however beyond all question also of eastern origin.

Eight species are enumerated by Risso, whom we follow in the present article; we regard it however as a matter of great doubt how far they are really distinct. The orange, the lemon, the lime, and the citron were all that could be distinguished amongst the mass of specimens collected for the East India Company in Nepal; and there is no great difficulty in believing that all the numerous varieties now cultivated in every part of the temperate and tropical zones, both of the old and new world, have in reality sprung from those four original sources: part of them being natural varieties obtained by long cultivation, and part being hybrids created by accidental circumstances or artificial means.

1. *Citrus Aurantium*, the sweet orange. (*Oranger* of the French, *Arancio* of the Italians.) Stem arborescent. Leaves ovate-oblong, acute, a little serrulated, with the stalk more or less winged. Flowers white. Fruit many-celled, roundish, very seldom pointed, golden-yellow or tawny. Cysts in the rind convex. Pulp very sweet. The principal varieties of this are:—

a. The China orange, with ovate-oblong leaves; round, smooth, rather flattened fruit; and a thin golden-yellow rind. This is the common orange of the markets, and of the Portuguese.

b. The pear-shaped orange, with elliptical, acute leaves, and great top-shaped fruit, with a deep yellow smooth rind; a rare and curious sort not known in the market; it is one of the most capable of resisting cold.

c. The orange of Nice, with ovate-acute leaves, and large, thick-skinned, rough, dark yellow, round fruit. This is considered one of the finest of the whole genus, both in regard to beauty, size, productiveness, and quality. It is a good deal cultivated about the town whose name it bears.

d. The tiny-fruited orange, with ovate-oblong acute leaves, tiny globose fruit, and a thin, smooth, golden-yellow rind. Supposed to have been brought from the Philippines. The fruit is more curious than beautiful or good.

e. The fingered orange, with little stiff leaves, and ovate fruit, some one at least of whose lobes is separate from the remainder, and horned; rind pretty thick. This must not be confounded with the fingered citron hereafter to be mentioned.

f. The blood-red orange, with ovate-oblong pellucid leaves, and middle-sized, round, rough, reddish-yellow fruit; with a pulp irregularly mottled with crimson. This, which is said to have come from the Philippines, was once looked upon as a great curiosity, and living plants were purchased at a considerable price; it was thought to be produced by grafting an orange upon a pomegranate. Now that it is known to be a variety of indifferent quality, and that its fabulous history is forgotten, it has ceased to attract much notice. A trifling variety of it is the Arancio di Sugo rosso of the Italians, who call the real blood-red variety Arancio di Malta sanguigno. Another variety, with small fruit, is the Arancio a Foglia stretta of Nice.

g. The ribbed orange, with oblong acute leaves, and a flattened ribbed deep orange fruit. This is one of the most tender of the varieties; its fruit is spongy, and of no value.

h. The sweet-skinned orange, with broad taper-pointed leaves, roundish, rather ovate heavy fruit, and a deep yellow, smooth, thick, sweet, soft rind. This is the Pomme d'Adam or forbidden fruit of the shops of Paris. Its pulp is subacid and pleasant, and as deep a yellow as the rind, which is soft and melting like the flesh of a cling-stone peach: the acidity of the pulp is agreeably mixed with sweetness, and renders the fruit extremely pleasant. This is very different from the forbidden fruit of the London shops; see C. decumana further on.

i. The Mandarin orange, with flattened, rough, deep orange fruit, and a thin rind, which separates spontaneously from the pulp. This sort has been raised in China, where its fruit is chiefly consumed in presents to the great officers of state, whence its name. It is now cultivated in Malta, where it arrives at perfection. Its singularity consists in the rind so completely separating from the pulp when quite ripe that the latter may be shaken about in the inside. In quality this yields to no known kind. There are two sub-varieties.

k. The Saint Michael's orange, with small, round, pale yellow, seedless fruit, having a thin rind and an extremely sweet pulp. This, when in a state of perfection, is perhaps the most delicious of all the oranges, and it is by far the most productive. Great quantities are imported from the Azores, where it appears to be exclusively cultivated as an object of trade. It is said that 20,000 of these oranges have been packed from a single tree, exclusively of the large quantity which were blown down or rejected as unfit for sale.

Besides these, there are numerous other sorts to be found in the gardens of the curious, and in commerce are many kinds about which little is known. Among these may be mentioned the egg-oranges of Malta, which are sometimes sent to England as presents; they are not however equal in quality to the China or the St. Michael's varieties.

2 *Citrus Bigaradia*; the Bigarade, or bitter orange (*Bigaradier* of the French, *Melangolo* of the Italians). Branches spiny. Leaves elliptical, acute, with a winged stalk. Flowers very white. Fruit middle-sized, uneven, more or less globose, deep yellow, with an acid and bitter pulp. It differs moreover from the sweet orange in forming a smaller tree, having broader leaves, and larger and sweeter flowers, on which account it is always selected in preference for the purposes of the perfumer. Its fruit is much more uneven. Numerous varieties of it are known, among which are all those cultivated for the sake of their flowers; especially the horned Bigarade, a variegated variety of it, and the curled-leaved Bigarade. The

following are a few of the most striking forms of this species:—

a. The horned Bigarade, with a large pale yellow ribbed fruit, whose sides project into horns. This variety, which is of the same nature as the fingered sweet orange (var. *e.*), its horned appearance being caused by the separation of the carpels or fruit-lobes, is in great estimation on account of the powerful and delicious perfume of its flowers. It is the *Melangolo a frutto cornuto* of the Italians.

b. The Female Bigarade, with a deep yellow large coarse fruit, containing orange within orange. The circumstance from which this variety derives its name is not at all uncommon in the genus Citrus, but it exists here in perhaps the most strongly-marked manner. An orange, in its natural state, consists of one whorl of carpels, which are consolidated into a round fruit, each of whose lobes is one carpel. But it sometimes happens that two whorls of carpels combine to form the same fruit; in that case the inner whorl is consolidated into a central orange, and the outer whorl grows over it. Or, it may happen that three whorls of carpels constitute the fruit; in that case the innermost whorl will combine into an orange in the centre; the second whorl will form a coating over it; and the most exterior whorl will enclose the whole. Finally the carpels may separate wholly, as in the fingered citron, or in part, as in the fingered orange and Bigarade, and then the fruit consists of a number of lobes more or less distinct. Until the discovery made by Göthe of the real nature of compound fruit, oranges of this kind were looked upon as something wondrous, and many idle speculations existed as to their cause. A figure of this may be found in Risso's *Histoire Naturelle des Orangers*, t. 33, without however any explanation of the cause of the monstrosity.

c. The curled-leaved Bigarade; with very compact, blunt, small, curled leaves, and flowers growing in thick clusters at the ends of the branches. No variety is more generally cultivated than this for the sake of its flowers, which are large, sweet, and produced in extraordinary profusion. The French gardeners call it *Le Bouquetier*, or Nosegay plant, and *Bigaradier riche dépouille;* the Italians *Melangolo riccio*. The fruit is coarse, very light, uneven, and with a large conspicuous scar at the point. The plant itself is far more dwarf than the other varieties, and is one of the most robust of its race. It is a common object of cultivation all over the south of Europe.

d. The purple Bigarade; with leaves, flowers and fruit stained more or less with a dull purple, especially the young leaves. *Hermaphrodite* and *Bigarade violette* of the French, *Melangolo Pavonezzo* of the Italians.

e. The double-flowered Bigarade; with rather thick leaves, double flowers, round granulated fruit, and a thick rind; the common double orange of the nurseries. It is a great favourite in gardens, because of its multitudes of fragrant double flowers, which do not fall in pieces so quickly as those which are single; it loses its quality of producing double flowers if the soil in which it grows is not kept in a very rich state.

f. The Seville Bigarade or orange; with round dark fruit, having an uneven, rugged, extremely bitter rind. Commonly brought to the English market, where it is consumed in the manufacture of bitter tinctures and in the preparation of candied orange-peel. The bitter aromatic principle is a powerful tonic; it gives its flavour to the liqueur called Curaçoa.

g. The myrtle-leaved Bigarade; with small, very compact, ovate, sharp-pointed leaves, and small round fruit. Generally both in flower and fruit at the same time, if well cultivated. On this account and because of its dwarf habit, it is a very common object in gardens. It is said to be a Chinese production, and that it is employed by the Chinese gardeners as an edging of flower beds, in the same way as the dwarf box in this country.

h. The Bizarre Bigarade; with curled, rather deformed leaves, purplish or white flowers, and fruit of different sorts, some being round and of the common appearance, others half bigarades and half lemons or citrons, the pulp of some being sweet, that of others acid and bitter. A curious lusus naturæ, which was once thought to be the greatest prodigy in all the vegetable kingdom. It is however merely one of those sports, as they are technically called by gardeners, in which, owing to some unknown cause, some one individual assumes the appearance of two or more others in particular parts. Analogous instances are the grape called the variegated chasselas, some of whose fruit is black, some white, and some striped with both colours; the camellia, which bears red, white, and party-coloured flowers on the same stem; and the chrysanthemum, some of whose flowers are purple and others yellow. This Bigarade was raised from seed by a gardener at Florence in 1644, and has since been multiplied by grafting, and so has been preserved to the present day. It may be procured from the nurserymen of France and Italy, and it fruits annually in the orangery at Versailles.

3. *Citrus Bergamia*, the Bergamot Orange. Leaves oblong, flowers small, very sweet. Fruit pear-shaped or flattened, rugged, with a greenish-yellow smooth rind filled with concave receptacles of oil. Pulp subacid, very fragrant. The trees of this species are rather variable in appearance. The fragrance of both flowers and fruit is peculiar. From each of them the perfumer procures an essence of a delicious quality. The rind, deprived of the pulp, first dried, and then moistened with water, is pressed in moulds into fancy boxes for holding lozenges and other sweetmeats, and these boxes retain much of their recent odour. The Mellarosa of the Italians is a variety with ribbed fruit, having a broad scar at the summit; it is much esteemed on account of the abundance of its flowers.

4. *Citrus Limetta*, the Lime. Leaves ovate, obovate, and oblong, placed upon a wingless stalk. Flowers small and white. Fruit ovate or roundish, pale yellow, with a boss at the point; the cysts in the rind concave; pulp subacid. In foliage this resembles the lemon, but its fruit differs in the pulp never having the sharp and powerful acid of the lemon; it is on the contrary flat and slightly bitter: it is principally employed for flavouring punch, sherbet, and similar drinks. The varieties are of no importance; they principally differ in the thickness of their rind and in form. Here is to be arranged the round very uneven fruit called Pomo d'Adamo by the Italians, because they fancy that the depressions upon its surface look as if they still bore the marks of our universal father's teeth.

5. *Citrus decumana*, the Shaddock. Leaves large, with a winged stalk. Flowers very large and white. Fruit usually very large, roundish, pale yellow, smooth, with flat or convex cysts in the rind. Rind white, spongy, very thick; pulp juicy, sweetish, rather insipid. Shaddocks are among the largest fruits which are known, and are commonly cultivated in both the East and West Indies for the sake of the delicate subacid juicy pulp in which they abound. When they arrive at their greatest size they are called Pompoleons, or Pompelmousses; when at the smallest they form the Forbidden Fruit of the English markets. Another small variety, with the shaddocks growing in clusters, forms a larger tree than any other citrus; the fruit is about as large as the fist; it is what the West Indians call the Grape-fruit.

6. *Citrus Lumia*, the sweet Lemon. Leaves like those of the lemon. Flowers red externally. Fruit with the flesh and rind of a lemon, but with the pulp sweet, and the cysts in the rind both convex and concave. There can be no doubt that this is a mere variety of the next species, from which it only differs in the want of acidity in the pulp. Many sorts are known in orange countries, of which one, the *Commander's Pear*, resembles very much a large Beurré Pear; their fruit is seldom seen in England.

7. *Citrus Limonum*, the true Lemon. (*Citronnier* of the French.) Leaves ovate-oblong, usually serrulated, pale green, with a winged stalk. Flowers middle sized, red externally. Fruit oblong, very uneven, now and then almost round, with a pale yellow fragrant rind, dotted with concave cysts. Pulp juicy, and very acid. Of this species the cultivators take little pains to distinguish the varieties. When young plants are wanted they are generally raised from seeds in the orange countries, and hence the samples of fruit sent to market consist at all times of numerous sorts, differing very much in quality. Some of them have their rind so thick and insipid that they approach the citron in quality; one, with roundish rugged ribbed fruit, is called *Vignette* upon the Continent, where it is common; another, with oblong

extremely rugged fruit, is one of the *Poncires* of the French. The most distinct race is that which comprehends the *Perettes*, or little pears; they are very small in the fruit, which is a pale greenish yellow, and has almost the shape of an egg: their rind is more delicately perfumed than that of common lemons.

8. *Citrus Medica*, the Citron. (*Cedratier* of the French, *Cedro, Cedrato* of the Italians.) Branches short and stiff. Leaves oblong, toothed. Flowers purple externally. Fruit usually large, warted, and furrowed, with an extremely thick spongy rind, and a subacid pulp. This is an exceedingly variable species, chiefly valued for the fragrance of the rind of the fruit, from which a delicate sweetmeat is prepared. The Citron, supposed to be the Median, Assyrian, or Persian apple of the Greeks, is probably the most beautiful species of the genus. It is described by Risso as having a majestic port, shining leaves, and rosy flowers, which are succeeded by fruit whose beauty and size astonish the observer at the same time that their sweet odour gratifies his senses. The trees are constantly in vegetation, the flowers appear even in midwinter, and there is so continual a succession of them that flowers, young fruit, and ripe fruit, may always be seen together at the same moment. The Poncire Citrons are eight or nine inches long, and are the largest of the race known in Europe.

In China there is an enormous variety, with its lobes all separating into fingers of different shapes and sizes, whence its name of fingered Citron. The Chinese esteem it very much, both for its rarity and for the grateful odour of its rind. They place the monstrous fruits upon porcelain dishes, and have them in their apartments to fill the air with fragrance. Those who would study this genus in detail will find excellent figures of above 100 varieties in Risso's *Histoire Naturelle des Orangers*. A good commercial account of this interesting genus has still to be written.

For cultivation see [ORANGE.]

CITRUS AURA'NTIUM, ORANGE, of which there are two varieties, the sweet, or China orange, and the bitter, or Seville. The fruit of the latter, while small and unripe, is collected and dried; the smallest, which are of the size of a pea, are used for keeping issues open, and the larger for the preparation of the liqueur called Curaçoa. Of the ripe fruit every part is used either medicinally or dietetically. The rind, called flavedo, contains a bitter principle and much volatile oil; and either used at dessert, or reduced to powder and added to magnesia and rhubarb, furnishes a grateful tonic to the stomach in some forms of dyspepsia and gout. The pulp and juice are exceedingly agreeable to persons affected with inflammatory complaints, or a drink prepared from it (orangeade) is of great utility in bilious and gastric fevers, dysentery, &c. The roasted pulp forms an excellent application to fetid ulcers.

The peel of lemons is likewise employed, but it is not so warm and grateful as that of oranges, from containing less volatile oil. The powers of lemon juice are much increased by saturating it with chloride of sodium (common table-salt). It is then of great efficacy in the treatment of dysentery, remittent fever, the dry belly-ache, putrid sore throat, and other diseases occurring in the West Indies. Dr. Wright also recommends it in diabetes and lientery.

Citric acid exists in numerous fruits, particularly those of the orange tribe, such as the lemon and lime, either alone, or with malic and other acids; sugar, mucilage, and extractive are also present. The citric acid is separated and purified on a large scale, in the way before mentioned. [CITRIC ACID.] It is frequently adulterated with other acids, such as tartaric, sulphuric, muriatic, and oxalic, which may be detected by appropriate tests. Citric acid, when crystallized, has scarcely any odour, but a very distinct acid taste. It is soluble in cold, but more abundantly in warm water. Citric acid has the power of curdling the milk of most animals, but not the human milk.

As it is impossible to treat of citric acid apart from lemon juice, we class them together. The impression of both on the organ of taste is the same in kind, but different in degree. Concentrated citric acid is somewhat caustic, but lemon juice is gratefully acid. To imitate the natural state, citric acid is only given largely diluted. In this state it proves a pleasant drink in fevers and diseases where the temperature of the body rises above the natural standard. According to Broussais, it agrees better than any other acid with the stomach when affected with acute inflammation. It is not so pleasant as lemonade prepared from new fresh lemons, and according to the statement of Sir G. Blane, the solution of citric acid is not so efficacious in the prevention and cure of sea-scurvy as the recent lemon juice. This is attributable to the absence of the volatile oil and the bitter principle of the rind, which are valuable adjuncts to the citric acid in its action on the stomach. The utility of lemon juice in promoting the digestion of gelatinous meats, such as veal and turtle, is well known. Fresh lemon juice may be preserved in bottles in the same way as ripe fruits, by boiling the bottles in which it is contained for half an hour, first placing them in cold water, and gradually heating it, and as soon as the contents of the bottles have fallen to the temperature of the air, closing them hermetically. Where lemon juice so preserved, or fresh lemons, cannot be obtained by ships on long voyages, the dissolved citric acid, to which a portion of an alcoholic extract of lemon peel may be added at the time of using, must serve as a substitute, should any apprehensions of scurvy be entertained.

Lemon-juice is often a means of correcting acidity in the stomach, since, like most vegetable acids, it elevates the vitality of that organ, and prevents the formation of an excess of acid. On the same principle it is found to be a useful agent in elevating the powers of the stomach in the intermittent, remittent, and bilious fevers of America, many cases of which have yielded to a combination of lemon-juice, cinchona bark, and port wine. Lemon juice is often employed to rouse the stomach and nervous system after narcotic poisoning; but neither it nor vinegar should be used till all the poisonous substance is evacuated from the stomach, otherwise it increases the power of the poison.

Citric acid, as well as lemon juice, is much employed to decompose alkaline carbonates, forming therewith pleasant effervescing solutions. These taken in the act of effervescence are often of great utility in checking vomiting, and in reducing the temperature in inflammatory complaints. But in all cases of debility the employment of citric, or any other vegetable acid, for this purpose, is decidedly improper. The amount of injury done by the indiscriminate use of effervescing draughts made with a vegetable acid is incalculable. 'Were I required,' says Dr. Prout, 'to name the medicine calculated to do the most mischief, I should name the common saline draught formed of potash or soda and some vegetable acid.'

Citric acid alone is very useful in the phosphatic diathesis; it is the alkaline base in this combination which does harm. [CARBONIC ACID.]

Externally citric acid largely diluted has been beneficially employed as a refrigerating wash, in the same way as vinegar. Slices of lemon form useful applications to scorbutic and other sores, and also at the commencement of hospital gangrene.

CITTA' VE'CHIA. [MALTA.]

CITTERN (or *gittern*, or *guittern*), a musical instrument of the lute kind, mentioned by our old dramatists. [CITHARA.]

CITY. Certain large and antient towns both in England and in other countries are called cities, and they are supposed to rank before other towns. On what the distinction is founded is not well ascertained. The word seems to be one of common parlance, or at most to be used in the letters and charters of sovereigns as a complimentary or honorary compellation, rather than as betokening the possession of any social privileges which may not and in fact do not belong to other antient and incorporated places which are still known only by the name of towns or boroughs.

Sir William Blackstone is unfortunate in his attempt to define. 'A city,' he says, 'is a town incorporated, which is or hath been the see of a bishop.' (*Comm. Introd.*, section iv.) But Westminster is a city, though it is not incorporated. Thetford is but a town, though incorporated, and once the seat of a bishop. Whether Westminster owes its designation to the circumstance that it had a bishop for a few years of the reign of Henry VIII., and in the reign of Edward VI., may be doubted. But there are, besides Thetford, many places which were once the seats of bishops, as Sherburn, and Dorchester in Oxfordshire, which are never called cities. On the whole we can rather say that certain of our antient towns are called cities, and their

inhabitants citizens, than show why this distinction prevails and what are the criteria by which they are distinguished from other towns. These antient towns are those in which the cathedral of a bishop is found; to which are to be added Bath and Coventry, which, jointly with Wells and Lichfield, occur in the designation of the bishop in whose diocese they are situated; and Westminster, which in this respect stands alone.

A question may arise whether Manchester and Ripon will become cities, if the scheme for placing a bishop at each of them shall be carried into effect.

CIUDA'D, in Spanish, means a town, and forms a component part of several names of towns in Spain, such as Ciudad Real, the principal town of La Mancha. [CASTILLA.] Ciudadela, 'little town,' at the N.W. end of the island of Minorca, is a well-built town, with a small harbour and 7300 inhabitants. (Miñano.) [BALEARES.]

CIUDAD RODRI'GO, a town in the province of Salamanca, built on an eminence, on the right bank of the Agueda, in a fertile plain. It is fortified with a substantial wall and a ditch, and has a citadel, being a frontier fortress on the side of Portugal, from which it is about 16 miles distant. It is 55 miles S.W. of Salamanca, and on the high road to Coimbra and Lisbon. Ciudad Rodrigo is a bishop's see, and has a cathedral, which was built in 1170, and a seminary for clerical students. It is the residence of a military and political governor, and of an alcalde mayor for the administration of justice, and has 6000 inhabitants. (Miñano.) It was taken by the French under Massena in July, 1810, and retaken by Lord Wellington in January, 1812, after a siege, on which occasion he received the title of Duke of Ciudad Rodrigo.

CIVET. [VIVERRIDÆ.]

CIVIC CROWN. Among the Romans the civic was considered more honourable than any other crown. It was the recompense for the life of a citizen saved, either in battle or assault. A civic crown was conferred on Cicero for detecting Catiline's conspiracy; and afterwards upon Augustus, the reverse of many of whose coins bear the representation of it, with the inscription OB CIVES SERVATOS. This crown, which was in fact a wreath, was at first of elm, afterwards beech was used, and lastly, and most generally, oak. (Rasche's *Lexicon Rei Numariæ.*) Plutarch, in the Life of Caius Marius Coriolanus, has given what he considers to be the reasons for the choice of the oak. Pliny informs us that the civic crown was the foundation of many privileges. He who had once obtained it had a right to wear it always. When he appeared at any of the public shows, the senators rose to do him honour; and he was placed near their bench. He was excused from all troublesome duties and services; and his crown procured the same immunity for his father and his grandfather on his own side. (The reader may consult for further information, Polyb. lib. vi. c. 37; Plin. *Hist. Nat.* lib. xvi. c. 4; Tacitus, *Ann.* lib. iii. § 21; xv. § 12.)

CIVIL ARCHITECTURE. Although this term appears to imply no more than a particular branch of architecture in contradistinction to that called military, which was formerly more important than it now is in the modern system of warfare, it in reality comprises the whole of architecture considered in regard to design or as a fine art, since mere building, to whatever purpose it be applied, can never with strict propriety be so termed. Architecture includes construction, but it aims at something more—at grandeur or beauty, at exhibiting qualities and effects to which building and construction are no more than the means. Needless as this distinction may appear to be to many, persons in general, we apprehend, confound the *art* with what belongs to the science, and consequently imagine that the study of architecture concerns those only who follow it as a profession, or that it demands a knowledge of various dry and mechanical details, by which they are deterred from even approaching what they would soon discover to be attended with no more difficulty than what just serves to give excitement and to enhance the pleasure of the pursuit. Neither is its interest confined to criticism or the gratification derived from contemplating any particular building, but expands itself over the almost boundless tracts of historical research in all ages and countries wherever art has existed. It is a study, in fact, which is so intimately connected with nearly all the other arts, both ornamental and mechanical, and with the state of society, that it imperceptibly leads us to trace the progress or decline of civilization. Architecture therefore has many claims on the attention of those who can have no other inducement to study it than what it holds out in its character of a fine art and a pleasing intellectual pursuit, a character properly recognised and discriminated by the German term *Schöne Baukunst* (fine architecture), which, if adopted into our language, would at once remove that prejudice and misconception now so prevalent in regard to it.

So wide a field does the history alone of the art and its various styles embrace, that we cannot attempt to give anything like a general view of it, however rapid. Accordingly we shall confine ourselves chiefly to the Grecian style, as being that whence the Roman and Italian orders are derived, and which, so modified, prevails more or less throughout the whole of Europe, at the present day, except in those buildings, and they are comparatively few, where the Gothic is avowedly imitated. As to the question of the origin of Grecian architecture and its supposed derivation from the Egyptian style, we consider it unnecessary to make any remarks here, our object being only to explain the Grecian style and those styles which are undoubtedly derived from it.

Before we commence our remarks on Grecian architecture, it is necessary to explain that what is termed an Order consists of two principal divisions, the *Column* and the *Entablature—i.e.*, the upright support and the horizontal mass supported by it; the former being again divided into *Base*, *Shaft*, and *Capital* (except in the Doric order, where the shaft rests immediately upon the flooring); the latter also into three parts—*Architrave*, or Epistylium, *Frieze*, and *Cornice*. These together constitute an Order; which is further distinguished as belonging either to the Doric, or Ionic, or the Corinthian style, according to certain general proportions and characteristic embellishments. The scale for the proportions—that is, not the actual but the relative dimensions of the different parts compared with each other—is taken from the lower diameter of the shaft of the column, which is divided into two modules or sixty minutes. Modern systematizers, who have laid great stress upon proportions, have, contrary to the practice of the Greeks themselves, attempted to fix certain invariable proportions for each order; and some have maintained that by them, quite as much as by peculiarities of detail and embellishment, the character of an order is determined. In regard to proportions, however, even greater discrepancy is found between different examples of the same order, than between two distinct orders. We must therefore attend to certain indicial features and marks by which the particular order may be immediately recognized; thus the absence of base or mouldings at the bottom of the column, the plain capital composed of merely an echinus and abacus, and a triglyphed frieze, enable us to pronounce at once that the order is the Doric. In like manner the voluted capital, or the foliaged one, as distinctly denotes that it is either Ionic or Corinthian. In regard to the two last-mentioned, the principal distinction between them is confined to the capital; there being no other determinate difference between the columns of the one or the other, or in the entablatures, if we except the modillions peculiar to the Corinthian, as we find it in Roman examples. Were we to see only the shaft of the column, we should be able to decide from that alone whether it were Doric or not; the flutings peculiar to that order being broad and shallow, and forming sharp ridges or arrises on the circumference of the shafts; whereas in the other two they are narrower and deeper, rounded at their extremities, and divided from each other by fillets or spaces left between the channels on the surface of the shaft. In like manner were we to see the fragment of an architrave, we could pronounce with tolerable certainty whether it was Doric or not; although in the latter case not quite so clearly whether it was Ionic or Corinthian. The Doric architrave consists of a single plain face surmounted by a broad fillet, here termed the tænia, to which another fillet with small cylindrical guttæ or drops is attached beneath each triglyph; but the architraves of the other two orders are divided into (generally) three faces or faciæ, slightly projecting one above the other, and crowned by curved mouldings, sometimes plain, but more frequently enriched. By attending to these few simple and obvious distinctions, no one can feel any difficulty in ascertaining the particular order to which a building belongs.

Strictly speaking, only two orders were employed by the

Greeks, the Doric and Ionic; for although we have a most florid and beautiful specimen of the foliaged capital in the small structure called the choragic monument of Lysicrates, and one or two other examples, partaking more or less of the general character of what is called the Corinthian capital, yet these scanty and imperfect remains do not go far towards proving that a distinct order of the kind—of which they appear to have been only the first essays and rudiments—was recognised in their practice by the Greeks. If such had been the case, we should doubtless have found the character now marked by the capital alone more fully developed throughout.

The earliest examples of the Grecian Doric—as, for instance, that of the temple at Corinth—are marked by a massiveness of proportions approaching to heaviness, if not to rudeness; which circumstance, together with the narrowness of the intercolumns (spaces between one column and another), favours the supposition that the Greeks borrowed their first ideas of architecture from Egypt; and if this be admitted, the hypothesis of the different parts of a Grecian structure being derived from a primitive timber hut, falls at once to the ground. The following considerations also are urged against this hypothesis. Unless the aim had been to make the hut itself in the first instance resemble as nearly as possible an erection in stone, such timber model would have given rise to a much lighter style of architecture. If single pieces of timber of sufficient thickness and length for the columns could have been procured, so could they also for the architraves; nor could there have been the slightest occasion for putting the columns so close together. It will be said that we do not see the first essays in stone, which undoubtedly retained more of the character of the timber prototype, but structures wherein greater solidity had been introduced so as to render their character and proportions more conformable with the nature of the material employed. Yet as far as extant examples themselves afford any proof, the reverse of this took place; since in them we observe a progressive change from heaviness to lightness—from columns less than four diameters in height to those of nearly seven. The chief circumstance that favours the idea of the Grecian style being derived from timber construction is, that the columns are round and tapering like the stems of trees; a form not likely to have been adopted had stone been employed from the first, it being more natural that the pillars should have been square. But, it is urged, that this circumstance ought to lead us to adopt the same hypothesis in regard to Egyptian architecture; whereas by supposing that the Greeks took their first ideas from that source, perhaps all the difficulties attending the other hypothesis are removed. 'The entire character of Grecian architecture,' says Wolff, in his 'Beyträge zur Æsthetik der Baukunst,' 'as well as of Egyptian, is essentially connected with construction in stone, which alone is capable of accounting for the architectonic principles it exhibits.' In stating these opinions as to Grecian being borrowed from Egyptian architecture, it must be observed that many strong reasons are urged on the other side; and so far as there is any direct historical evidence either on one side or the other, it is in favour of the hypothesis against which we here contend. [ARCHITECTURE.]

In attentively examining the Grecian Doric, we can hardly fail to note what admirable taste and study of effect it exhibits throughout, and how every part is made to conduce to the character of the whole. The columns are of short proportions, the entablature deep; the former have no bases, which, owing to the narrowness of the intercolumns, would have proved highly inconvenient, and instead of producing an air of finish would rather have occasioned heaviness. The proportions themselves are such as to reject any addition of that kind at the lower extremity of the column, because the difference between the upper and lower diameter—which, owing to the shortness of the shaft, occasions so visible an inclination as to produce the effect of tapering upwards—causes it also to appear to spread out below in such manner that the lower extremity becomes a sufficiently wide basis. This inclination is further rendered more apparent than it would be by the outline alone of the column, owing to the lines being repeated in the fluting. The fluting, while it diminishes the heaviness, produces great variety of light and shade in every direction; and the mode of fluting peculiar to this order is admirably in unison with the expression of all the rest, the channels being wide and shallow, and separated from each other by mere ridges on the surface; both which circumstances contribute to that breadth and simplicity which pervade the other parts. No less appropriate and well imagined is the capital, which consists of little more than an echinus and deep square abacus above it; the former expanding itself out from the neck, or upper part of the column, until its diameter becomes equal to that of the foot of the column: in reality, it is something greater, but not more so than is requisite to counteract the apparent diminution caused by the greater distance from the eye. Thus harmony is kept up between both extremities of the column, verticality is restored, the projection above (as in the case of the sloping wall and coved cornice of Egyptian structures) is made to restore perpendicularity by adding just as much as had been taken away by the diminution of the shaft upwards, and a play, variety, and contrast are produced, unattainable by any other mode.

The architrave is plain and deep, well proportioned both as to the weight which it has to bear and to the column below, its average height being equal to the upper diameter or narrowest part of the column. The width of its *soffit*, or under side, is about a medium between the two extreme diameters, so that it overhangs the upper part of the shaft; yet it is not so broad as the abacus of the capital, which by opposing a greater surface to it appears better calculated to support its pressure. In Roman and Italian Doric, on the contrary, this division of the entablature is much slenderer, both as compared with the column itself and the frieze above it, and is frequently made to appear still weaker by being divided into *fuciæ*, the lowermost of which is made the narrowest. In the Grecian Doric the frieze is generally of the same dimensions as the architrave, very rarely deeper, in some examples not so deep; wherein again it differs materially from the styles just mentioned. The *triglyphs* which decorate it, and are peculiar to the order itself, are upright, slightly projecting tablets (in width rather more than half the lower diameter), channelled with two grooves or glyphs (γλυφαί), and with a half groove chamfering off each of its outer edges. The spaces between these ornaments, which were originally intended to represent the extremities of the beams (whether stone or timber) resting upon the architrave and forming the inner roof or ceiling are square, or nearly so, and are distinguished by the name of *metopes* (μετοπαί): *i. e.* openings or intervals. They are in fact so many small pannels, and were generally filled with sculpture in bas-relief, although there is hardly an instance of the kind in any of the numerous modern imitations of the Greek Doric. Beneath each triglyph is a series of small *guttæ*, or cylindral drops, attached to a fillet, just under the moulding of the architrave, to which division of the entablature they may be said to belong, although evidently a continuation of the ornaments on the frieze. Some suppose them to have been intended to represent nails, others drops of water running down the channels of the triglyphs and settling beneath them; yet be that as it may, they certainly contribute in no small degree to architectonic expression and effect, inasmuch as they break the monotony of line, and by extending some ornament to the architrave bring it into harmony with the frieze. The space between one triglyph and another being regulated by the height of the frieze, since each interval or metope forms a square, this circumstance also regulates the *intercolumniation*, or distances at which the columns are placed; because as there must be a triglyph over every column, there cannot be more than one triglyph over each intercolumn, unless the latter be increased to the extent of another triglyph and metope; that is, made half as wide again. Consequently there are hardly any instances of more than *monotriglyphic* intercolumniation (that is, with more than a single triglyph over each intercolumn) in Grecian buildings, except when the centre intercolumn is made wider than the others, as in the Propylæa at Athens, where a ditriglyphic arrangement is employed.

Like every other part of the order, the Grecian Doric cornice is composed of few and bold parts; it consists of little more than a corona (the projecting and principal member in every cornice), finished above by one or two simple mouldings, and having attached to its soffit a series of shallow plates or tablets, studded with guttæ. These are termed *mutules*, and are the peculiar distinctive marks of the Doric cornice; in like manner as dentils are of the Ionic, and modillions of the Corinthian. They may be sup-

sidered as being to the cornice what the triglyphs are to the frieze, and there is one corresponding to each metope as well as each triglyph; which produces a beautiful gradation of parts, for as there is an additional triglyph between every column, so is there an additional mutule between every triglyph; whereas, were there no more triglyphs than columns, and no more mutules than triglyphs, the effect would be both monotonous and poor, and these different features would be confined to distinct lines from top to bottom. The average height of the entablature is about two diameters, or one-fourth of the whole order, taking the height of the column at six diameters.

The sloping or *raking cornices* of the pediment resemble the horizontal one, except that there the mutules are omitted, although not in Roman or Italian Doric. In order, however, to give increased depth and importance to the pediment, as the finish of the whole structure, its cornices have an additional member, termed by some the *epitithedas*, consisting of an ovalo or convex moulding, or a cymatium; sometimes deeper, sometimes shallower. This *epitithedas* was continued a little way at the angles, where it usually terminated against a block, carved with a lion's head, or some other ornament. The face of the pediment itself, termed the *tympanum*, (called by the Greeks ἀετός, ἀέτωμα) was almost always filled with sculpture. The pediment was invariably of a low pitch, but not always of the same pitch; on the contrary, whatever the span might be, its height continued nearly the same, it being more or less acute, in proportion as the portico was narrow or broad: its average height was equal to that of the entablature, and either a little diminished or increased according to circumstances, but hardly ever so much as to render the tympanum deeper than the entablature.

For practical examples of this order, where the reader may study its character, and learn to distinguish, in actual buildings, the various members and particulars here pointed out, we refer to the portico of Covent Garden Theatre and the new Corn-Market, Mark Lane, in which latter the frieze is decorated with wreaths instead of triglyphs—as in the monument of Thrasyllus at Athens—and consequently the spaces between them cannot be called metopes; and the new galleries in the west wing of the British Museum.

In the Ionic order the column differs widely from that of the Doric, not only in the form of its capital, and in having a base, but in the contour of its shaft and the mode of fluting, it being more slender and not tapering so suddenly. All these differences, it appears to us, arose entirely from the form of the capital itself. Whatever may in the first instance have led to the adoption of volutes as ornaments to capitals, it is obvious that the flowing luxuriant character thus given to that part of the column required that the severity of all the rest should be mitigated, for what was graceful simplicity in the Doric would appear only offensive harshness when the capital itself was altered. In order, therefore, to restore consistency and harmony, it became necessary to reduce the bulk of the lower part of the shaft, yet at the same time to leave it sufficiently thick at bottom to prevent it from appearing top-heavy, as it must have done, had the capital expanded so much more than the foot. Consequently, in paring away the shaft, it was necessary to leave the footing of it as thick as before. Yet, had no more than this been done, the effect would have been unsightly; accordingly, the portion left as the footing of the column was formed into mouldings, termed the base, which base therefore was not, strictly speaking, added to the column, but shaped out of what remained after the part above it had been pared away. If there be any merit in this idea, we may claim it for ourselves; and although it may be deemed fanciful, not only does it appear a natural and rational process, but if we take the first or under torus of the base for the lower or prime diameter, we shall find that the Ionic column agrees very nearly with the standard Grecian Doric, of six diameters in height. The base is generally that termed the Attic-base, composed of two tori, or convex rings, with a concave moulding, the scotia, between them; for as the Doric character demands plane surfaces and lines, so does the Ionic require curved mouldings and contours, as harmonizing with the curved forms of the volutes of the capitals. To prevent the harshness which would result, if the mouldings forming the base jutted out abruptly from the lower end of the shaft, the latter is made to spread itself out immediately above the base in a sweeping curve, termed the apophyge. The number of the flutings of the shaft is increased from twenty to twenty-four; besides which there are spaces left between them (fillets); for the mere arrises or sharp edges, peculiar to the Doric or earliest mode of fluting, would be utterly at variance with the rounded contours of the base and capital. The channels themselves being thus multiplied and set apart from each other, are consequently much narrower than those of the other order, and considerably deeper in proportion to their breadth; and instead of terminating in flattish curves, their extremities are made the half of a circle, or an ellipse: all which circumstances contribute to uniform delicacy of expression. It should be observed, too, that the upper torus of the base was generally fluted horizontally, thereby producing uniformity of decoration between that and the shaft, with contrast as to the mode of applying it. When not so fluted, that torus was sometimes enriched with a *guilloche*, a beautiful sort of chain-like ornament sculptured on its surface.

The capital may be described generally as consisting of two faces, about as wide, measured across the volutes, as the base—that is, a diameter and a half, or 90 minutes; which breadth is divided into three equal parts (more or less), 30 minutes being allowed for each volute. These volutes are composed of spiral mouldings, which make several revolutions, and gradually become narrower as they approach what is termed the eye or cathetus: in the richer capitals of this class there are intermediate spirals, following the course of the other; the spaces or interspirals, forming slightly concave surfaces. In all the Athenian examples there is also a flowing or festoon hem forming the lower edge of the face between the volutes, whose curve harmonizes most beautifully with the outline of the volutes themselves; whereas, in the capital of the Asiatic Ionic, as well as the Roman and modern Italian, the volutes are here connected by a straight line. Immediately beneath this part of the capital is a carved convex moulding, to which succeeds the echinus or ovolo (so called because invariably cut into the form of eggs), and lesser mouldings. The idea of an Ionic capital therefore seems to have been that of introducing an ornamental mass between the echinus and abacus of the earlier shaped capital, and rolling up its deep projecting extremities into volutes. Besides the capital (properly so speaking, where additional richness was required, and also increased height for the column, without much increasing that of the shaft), a necking, enriched with sculpture, and separated from the shaft by a carved convex moulding, was introduced. The abacus is square in plan, and its sides form a cyma reversa, or ogee moulding, either carved or plain, according as the capital itself is more or less enriched. But the capital itself, at least that portion of it occupied by the volutes, is not so deep on its sides as on the two faces; the reason for which is obvious, because either those faces must have been much narrower, or if this part formed a perfectly square mass of a diameter and a half, it would overhang the upper parts of the shaft, and project beyond the architrave in a most unsightly manner. The baluster sides of the volutes, as they are termed, are, for the sake of elegance and lightness, hollowed out so as to assume something of the appearance of two tubes or horns, whose broader extremities or mouths come against the back of the volutes. The capitals at the angles of a portico are frequently differently arranged, since, in order to obtain a face on the return similar to that in front, the outer volute is turned diagonally, so as to serve for both faces; a mode adopted for all the capitals, without distinction, by many Italian architects. The architrave is divided into three nearly equal faciæ, projecting very slightly one over the other, and crowned by a cyma recta moulding, carved or plain, as the rest happens to be more or less enriched. There being no particular members appropriated to the frieze, as in the Doric order, unless enriched with sculpture, it is a mere plain surface; but although generally so decorated by the Greeks, there is hardly an instance of it among ourselves, except in the portico of the East-India House. Examples have been found in Sicily of triglyphed friezes above columns of this order; which seems to show that the change from Doric to Ionic was progressive, and that some of the features now considered peculiar to the entablature of the former were not discarded till some time after columns with bases and voluted capitals had been employed.

The cornice in Athenian examples is exceedingly simple, consisting only of two mouldings beneath the corona, the uppermost being within the hollowed soffit of that mem-

ber; nor do dentils, which are generally reckoned the distinguishing marks of the Ionic cornice, appear to have been used, except by the Asiatic Greeks. Consequently, unless the frieze is enriched with sculpture, so as along with the cornice to produce a rich ornamental mass above the architrave, not only is the cornice apt to appear meagre, but the whole entablature to look cold and naked, even plainer than that of the Doric order, and to offer anything but a pleasing contrast to the elegant richness of the capitals below it. Accordingly, when the frieze is left plain, it becomes almost indispensably necessary to give greater depth to, and bestow more ornament on, the cornice itself; which has been done, by Mr. Gandy Deering, on the front of the beautiful little church in North Audley Street, where, besides dentils and additional mouldings, there is an epithetidas or cymatium above the corona, enriched with panthers' heads.

What has already been said in regard to the pediment will suffice for this order likewise, there being no other difference than what is occasioned by the cornices themselves. But having thus far explained the two chief Greek orders or styles of columns, in regard to columns and entablatures, we now proceed to notice what in certain situations are employed as adequate to, or substitutes for, columns, namely, *antæ*, or pilasters. In Italian architecture, pilasters are very frequently employed in lieu of columns, or are placed against a wall to correspond with a range of columns in front of it; their bases and capitals, too, are made to correspond with those of the columns, as far as the difference between a square and circular plan will allow. The Greeks, on the contrary, never employed antæ, except at an angle or the extremity of a wall; and instead of aiming at perfect similarity, they purposely gave to such pilasters, bases and antæ-caps, dissimilar from those of the columns; neither did they diminish them, but made them of the same width above and below, which width was determined by that of the soffit of the architrave, and was therefore something less than the lower diameter of the column, but greater than the upper one, since both in the Doric and Ionic the architrave overhangs the upper part of the column. Thus they kept the antæ and columns quite distinct in character, thereby producing variety and contrast without injury to consistency. Sometimes the Doric anta has a simple kind of moulding and groove at its foot, which seems requisite to detach it from the wall, whereas the plain foot of the column resting on the pavement or steps defines itself to the eye quite sufficiently. The Doric anta-cap is very simple, and its abacus and other mouldings much narrower than those of the column capital. If such were not the case, the mouldings under the abacus being square like that member, whose angles do not overhang them as they do the circular echinus, the whole would look exceedingly clumsy and coarse, and the capital be enormously wide in comparison with the anta itself; because that being no broader at bottom than above, such capital would extend very preposterously far beyond the line of the base.

Although more ornate than those of the Doric, Ionic antæ-caps differ still more than the others do from the capitals of their respective columns, inasmuch as they have nothing whatever answering to those exceedingly characteristic features, the volutes; nevertheless they are so strongly marked by the same style as to render it impossible to mistake them, or attribute them to any other order. Between the bases of the antæ and those of the columns there are very slight differences; the chief is that besides the upper torus being fluted like that to the base of the column, the under one is also enriched, but by reeding or convex mouldings. There is also an additional concave sweep moulding placed beneath the torus. It is further to be observed that antæ are never fluted, as is generally the case with Roman and Italian pilasters whenever the columns are so, and consequently a stronger distinction is kept up between the antæ and the columns; and in fact the plane faces of the former are very ill suited for such channelling, which would only produce monotony by so many parallel lines and hollows all casting the same shadow; and least of all is the Doric mode of fluting adapted to such purpose.

In the above sketch of this order we have merely pointed out in a general manner the leading characteristics, without taking notice of the very numerous varieties, since hardly any two examples are perfectly alike, and some are strikingly dissimilar from any other. One of the most remarkable is that of the internal order of the Temple of Apollo at Bassæ, near Phigaleia, in Arcadia. The base, which is altogether different from the Attic one, is of great diameter compared with the shaft, which spreads down to it with a sudden sweep; hardly less peculiar is the style of the fluting, the channels being very broad and shallow, and the fillets very narrow, while the extremities of the channel are hardly curved at all, so that it seems but the first remove from Doric fluting. The capital is still more extraordinary, inasmuch as there are four voluted faces; at least there would be, if the columns were not attached to projecting piers. In order to effect this the faces are made concave, so that the volutes turn out towards the angles, and are placed at only half the usual distance from each other, so as to reduce still more the width of each face, else, as has already been remarked, the capital being square, it would be too bulky for the column. In its detail this capital is so plain that it looks very much like one of the earliest essays at a voluted capital; nor is it improbable that at first the design was to make such capitals perfectly square like the Doric abacus and to produce four uniform voluted faces.

Another unusual variety is that of an Ionic capital, met with by Mr. Inwood among some fragments on the banks of the Ilissus, near Athens, in which the eye of the volute is remarkably large, and carved into a rosette. He has given capitals of this sort to the columns in the portico of the church in Regent-square, London; and also very singular bases. As far as the columns alone go, that portico is exceedingly well worth notice. But the finest modern specimen of Athenian Ionic is the portico of St. Pancras' church, London (also by Mr. Inwood), an exquisitely finished copy of one of the most florid specimens of the order, that of the Erechtheion. On the lateral porches at the eastern end he has given an application of Caryatides or female columnar statues supporting an entablature [CARYATIDES], after the small building called the Pandrosium, attached to one angle of the Erechtheion. Other modern examples of the Ionic order in the metropolis are, the India House, which is more Asiatic Ionic than Athenian; the portico of Hanover Chapel, Regent-street, also Asiatic, being after the order of Minerva Polias at Priene, and which exhibits also the singularly formed Ionic base; the New Post-office; the University Club-house; the Law Institution, Chancery-lane; and particularly the portico of the College of Surgeons, Lincoln's-inn-fields, as lately perfected by Mr. Barry. This last mentioned is after the small temple on the Ilissus, so deservedly admired for the bold and graceful simplicity of its contours and proportions.

In regard to *intercolumniation*, or the distances at which columns are placed from each other, and upon which so much of their effect depends, it has already been mentioned that in the Doric order this is regulated by the triglyphs, and that monotriglyphic intercolumniation may be considered as the extreme of pycnostyle (thickly set), as it will sometimes occasion the columns to be less than a diameter and a half apart, the limits assigned to pycnostyle. But this of course depends upon the proportion which the metopes and triglyphs bear to the lower diameter of the columns. That such very close arrangement should be employed for the most solid of the orders, would almost appear an incongruity; yet it should be observed that in reality this arrangement is not so close as it appears to be, when expressed by the proportion which the foot of the column bears to the intercolumn, because the shafts taper so much that what would be an inter-column of less than a diameter and a half below, would be two of the upper diameters, or more, above. The second mode is termed *systyle*, or two diameters apart; the third *eustyle*, or two and a quarter; the fourth *diastyle*, or three diameters; and, lastly, *aræostyle*, or four or more diameters. But the precise spaces thus laid down do not seem to have been adhered to; and the Greeks, who seem never to have worked according to fixed rules, although precise rules have been since laid down from their works, seem to have allowed themselves any intermediate interval from a diameter and a quarter to two diameters, which they rarely exceeded, except when particular circumstances required it, and when the columns themselves were so small, that had they not been more than two diameters apart, the intercolumns would have been inconveniently narrow. When the columns are pycnostyle or less than two diameters apart, they produce richness not only by their increased number in a given space,

but also owing to their being forcibly relieved by the increased depth of shadow behind them.

Simple as are the plans of Grecian temples, there are many terms required to express their varieties in regard to the application of columns, besides those denoting the number of columns in front, that is, beneath the pediment. Thus, if there were columns only in front, the building was termed *prostyle;* if at each end, *amphiprostyle;* if there were also colonnades along the sides, it was said to be *peripteral,* that is, with wings (aisles) or colonnades quite round it. When there were two rows of columns, one behind the other, it was termed *dipteral.* Again, where a range of columns was placed between antæ, forming the extremities of walls at right angles with such colonnade, it was said to be *in antis.* This was generally the case with the pronaos, the vestibule or inner portico behind the columns in front. According to the number of columns in front, porticos are said to be *tetrastyle,* that is, with four columns; *hexastyle,* with six; *octastyle,* with eight; *decastyle,* with ten; and *dodecastyle,* with twelve, the greatest number that can very well be brought beneath a pediment; and even of these two last the examples are exceedingly rare. If instead of columns at the angles there were antæ, then the number of columns alone was reckoned as before, and would denominate what would be equivalent to a portico containing two more: thus a *distyle in antis, i. e.,* two columns between two antæ, would be equal to a tetrastyle, as in both there would be three intercolumns; a *tetrastyle in antis* would be equal to a hexastyle, and so on. By means of this simple mode of numerical notation, a couple of words suffice to explain in the concisest manner what even a long description may leave doubtful: for instance, when we say that a portico is hexastyle Ionic, we clearly specify the order, and the number of columns in front; and it is upon this latter circumstance that so much of particular character depends. By way of example, we instance the following structures: distyle in antis, the church in North Audley-street; tetrastyle, portico of Covent-garden theatre, and Hanover Chapel, Regent-street; tetrastyle in antis, Law Institution; hexastyle, the porticos of St. Martin's; St. George's, Hanover-square; ditto, Bloomsbury; St. Pancras; Post-office; College of Surgeons; Colosseum, Regent's-park, &c. Octastyle, portico of the National Gallery; and decastyle, that of the London University: of which two latter classes these are the only instances at present in the metropolis; unless we choose to reckon the centre of the south front of the Bank as an octastyle; yet although it is a range of eight columns, they are so very little advanced from the wall behind them, that they cannot be said to constitute a portico of any kind. This example might therefore not improperly be designated a pseudo-portico. In like manner the ranges of columns in the wings of the Bank might be distinguished as screen, or pseudo-colonnades.

With us the use of the term portico is technically restricted to a range of columns crowned by a pediment, and forming an outer vestibule at the chief entrance to a building. It is not however absolutely necessary that there should be a pediment in order to entitle them to such appellation: for instance, the portico of the College of Surgeons has no pediment. When the portico advances beyond the main body of the edifice it is described as prostyle, and may be further distinguished according as the projection is made by one or more intercolumns at its sides: thus we should say that the portico of Surgeons' College is hexastyle, Ionic, unpedimented, prostyle of one intercolumn (*i. e.,* is only one intercolumn in depth); St. Martin's Church, Corinthian, hexastyle, prostyle of two intercolumns. When the columns are in antis, the portico is inclosed, though not necessarily recessed; a distinction that should be attended to if we would avoid ambiguity. For instance, St. Paul's, Covent Garden, is inclosed at its sides, but not recessed within a general line of front extending on each side of it; as is the case with the portico of the India House; which, besides being recessed, may also be taken as an example of pseudo-prostyle, inasmuch as the columns are advanced beyond the line of the rest of the front, but not so much as to constitute an intercolumn. A recessed portico is sometimes, by way of distinction, termed a loggia. We have instances also of porticos partly recessed, and partly prostyle, as that of the Post Office, which, besides advancing before the building, retires within it. Lastly may be mentioned the prostyle in antis, that is, a portico in antis enclosed at its sides, but attached and projecting from a larger mass of building, as the entrance to the Athenæum Club-house. Colonnade, on the contrary, is a general term for any range of columns. The term peristyle is often applied in the same sense, yet very inaccurately, since it denotes a colonnade continued quite round a building, as in the new Town Hall at Birmingham (at least columns are there continued along the two sides as well as the front), and the Bourse at Paris; we may also very properly speak of the peristyle of the dome of St. Paul's.

So far from employing pedestals to columns, which some have considered as forming as essential a part of an order as the entablature, the Greeks placed their columns immediately on the floor, or uppermost step; the whole temple being generally raised on a low platform, to which the ascent was usually by three deep steps, or gradini, serving as a base to the edifice; the depth of the steps was not accommodated to the human stature, but regulated so as to accord with the dimensions of the column. It is, therefore, conjectured that either a sloping platform of wood, or lesser steps of the same material, were employed as the real ascent to the temple. There are gradini of the above description to the portico of the Glyptotheca, at Munich, where a flight of steps is cut out of them, leading up to the centre intercolumn. The Greeks invariably placed their columns singly, never in pairs, as has frequently been done by modern architects, and which, if not utterly indefensible, ought never to be resorted to, unless required by positive necessity; for instance, where wider intercolumns than the scale of the order will properly admit, are required, in which case, by affording additional support to the entablature, coupled columns not only excuse the width of the intervals, but take away the air of poverty that would result from single columns placed at the same distance from each other. Coupled columns are most of all offensive when forming a prostyle colonnade, especially if it be one with a pediment, since that disposition approximates so closely to that of the front of an antient temple, as to render any incongruity the more striking. Were it, therefore, on this account alone, the portico of the new palace, St. James's Park, must be pronounced unsatisfactory: and we may remark that although it has eight columns in front, we did not cite it as an octastyle example, because the columns being in pairs, there are only three intercolumns; it may therefore be termed a double tetrastyle.

Of engaged columns, that is, columns half or three quarters of a circle in plan, and placed against a wall as if built into it, there are so very few instances in Grecian architecture, that they are to be considered merely as exceptions. One such authority for the use of half-columns occurs in the west front of the triple temple, or Erechtheion, at Athens. In the Italian, or Palladian school, they prevail almost to the exclusion of insulated columns. Yet not only is much of the effect of the columns themselves lost, but also that of light and shade. At present, columns are seldom attached, but left disengaged from the wall even when placed almost in contact with it. Attached columns have however been adopted in the Ionic hexastyle of the river front of the new Fishmongers' Hall, London, where, being surmounted by a pediment, they may be said to form a pseudo-portico. But if something like the authority of the Greeks themselves can be pleaded in support of engaged columns, it cannot be adduced as countenancing a barbarism to which that practice and the employment of wide intercolumns gave rise, namely, that of making a break in the entablature above every column, and thereby destroying the continuous horizontal line of that part of the order, and carrying the vertical ones up into it. Another practice, not observed in any extant Greek building,* is that of supercolumniation, or the placing one order upon another, sometimes even to the extent of three or more; the diameter of the columns decreasing, and of course the width of the intercolumns increasing as they ascend. Inigo Jones's building called the Banqueting-house, at Whitehall, affords an example of super-columniation, together with one of engaged columns and broken entablatures. There is also an instance of it in the New Palace, London, where a Corinthian order is placed above a spurious Grecian Doric, without

* The temple of Athena Alea, at Tegea, built about B.C. [illegible], by Scopas, had, in the interior, a Corinthian (*κόσμος Κορίνθιος*) imposed upon a Doric order. The exterior columns were Ionic. (Pausan., *Arcad.*, c. 45.) In this passage the word *κόσμος* (cosmus) corresponds to the modern word Order.

triglyphs, or any division of architrave and frieze; there is still another in the recently erected Atlas Assurance Office, Cheapside.

Although the name itself would seem to show the contrary, Grecian architecture affords no precedent for what is termed an Attic order, that is, a series of dwarf pilasters crowned by a cornice; and balustrades also are of modern invention. The only thing of the kind in ancient examples, and that of exceedingly rare occurrence, is a low and plain unbroken podium, or parapet, that is, without pilasters or other projections, above the cornice of a building. Far from attempting to conceal the roofs of their temples, the Greeks not only made them very conspicuous in the outline of the pediments, but bestowed much decoration on them, ornamenting the ridges and tiles, and placing a series of *antefixæ*, or enriched front tiles, above the cornice along the sides of the building. This species of embellishment has been adopted in the church of St. Pancras; which structure also affords beautiful and correct specimens of Grecian doors and windows. The latter, which are copied from those of the Temple of Minerva Polias, forming the western portion of the Erechtheion, are almost the sole extant type in Grecian architecture for such apertures. They are surrounded by a moulded architrave, and the jambs incline towards each other, so that the aperture of the window is somewhat narrower at the top than at bottom. This peculiarity may have arisen from the difficulty of procuring single stones for the lintel or upper architrave, wide enough to extend over an aperture equal to the sill of the window; yet it may also have been adopted entirely as a matter of taste, with the view of both producing a contrast between the sloping outline of the windows, and the vertical lines of the walls and antæ; and an accordance with the tapering form of the columns. What serves to countenance this last idea is, that we find the same principle observed here as in the column itself, namely, that of restoring at the summit what had been lost by diminution upwards; for as the capital spreads out as wide as the base of the column, so is the upper horizontal lintel made as wide as the sill of the window, by means of a break towards the top of the side architraves (technically called a knee), so that the architrave expands there to the width of the sill. These remarks may perhaps be thought to partake of a minuteness inconsistent with so brief a sketch as this, where many things generally noticed in similar articles are entirely passed over; yet although it is not professed here to teach much, we are anxious to teach that little well, and to lead the reader to examine and reason upon what he sees. By doing this at the outset of his studies, he will be far better prepared to pursue them with satisfaction, than he would be by having presented to him a dry statement of more numerous particulars, which would tend only to confuse, and may therefore very well be reserved until he shall have obtained such general insight into the subject as it is our object here to supply him with.

The doorways of Grecian temples were made lofty and spacious, not only for the sake of rendering them important architectural features, but also because the light was admitted into the cella, or interior fane, usually of small dimensions compared with the general structure, through the entrance. Almost the only instance of windows in such structures is that above mentioned, and consequently the interior was imperfectly lighted, unless the temple itself was of the kind denominated hypæthral, that is, exposed to the sky (as was the Parthenon), the centre portion being left unroofed, with merely a covered colonnade, or portico around it, above whose columns were others forming a smaller order; for, as such inner peristyle consisted of columns less in diameter and height than those of the exterior one, the additional tier was necessary to fill up the greater altitude occasioned by the slope of the external roof above them. Like the windows, Grecian doorways were sometimes narrower at top than at bottom, and were embellished conformably to the character of the building. One of the most elegant specimens is that of the division of the Erechtheion, called the Temple of Minerva Polias, copied in the central doorway of St. Pancras. Besides the architrave around the aperture, there is an outer border decorated with circular ornaments termed pateræ; and the whole is crowned by a beautiful corona and highly enriched cymatium, forming together a cornice supported on consoles (scroll-like brackets).

There was never more than one doorway within the portico, or pronaos, of a temple; of course, unaccompanied by windows, which, in such a situation, should be carefully avoided. If there is more than a single large aperture behind the columns, it produces not only confusion, but a crowded appearance on a surface where breadth and repose are especially requisite. How superior the effect is of a single doorway within a portico, or at most a principal doorway and a smaller one on each side of it, must be felt by every one who compares the porticos of the London University, the Post Office, St. Pancras Church, and the Colosseum, with those of St. Martin's, the College of Physicians, the Law Institution, and, indeed, almost every other.

Though the small structure at Athens, called the Choragic Monument of Lysicrates (copied in the belfry of St. Philip's Chapel, Regent Street), furnishes one of the most exquisitely designed examples of the Corinthian or foliaged-capital order that have been preserved to us, it is almost a solitary extant instance of the application of it by the Greeks; unless we choose to reckon as such the capitals of the small columns supposed to be those of the porch of the Tower of the Winds, and which have merely a single row of leaves at bottom. It is true that some magnificent edifices belonging to this order, such as the Temple of Jupiter Olympius at Athens, were erected in Greece; but they belong to a later period, after the order had been extensively employed by the Romans, who, whether its originators or not, brought it to perfection as a distinct style; for although various single capitals ornamented with foliage have been discovered among Grecian remains, they are as dissimilar from the Corinthian style as are the degenerate imitations of such capitals which occur in Lombardic and Norman architecture. That the Romans, with whose taste for magnificence this florid species of capital well accorded, succeeded in establishing a style comprehending many varieties of it, expressive of different degrees of character up to the most luxuriant richness, is evident from the examples they have left, almost every one of which is distinguished by some peculiarity, although they all agree in certain leading points. The average height of the column is ten diameters; yet the capitals and bases being proportionably deeper, the shaft itself is not much more than eight diameters. The capital is composed of two rows of leaves (generally those termed acanthus), those of the upper row springing up from between the lower ones. There are eight leaves in each row, so arranged that one of the upper ones accords with the centre of each side of the abacus; and from the sides of this centre-leaf spring out other leaves, whence emerge the helices or spirals, placed diagonally to support the extremities of the abacus, besides lesser spirals which meet, and sometimes intertwine each other above each middle leaf. The abacus itself, which is peculiar to this order, may be described as square in its general plan, but having its sides made somewhat concave, so as to curve out towards the angles, yet not overhang the body of the capital. Thus not only is extent given without heaviness, but a most pleasing contrast is produced between the convex surface of the column and the concave sides of the abacus. The angular helices were sometimes so enlarged as to assume the form of Ionic volutes placed diagonally. This kind of capital is termed Composite, and has been reckoned to constitute a distinct order, yet very improperly, since it does not affect the general character and proportions of the whole ordinance; and if a specific name is to be assigned to each variety, which is to entitle it to be considered a class by itself, we shall have almost as many orders as there are antient examples. Even the circumstance of the shaft being fluted or plain, which occasions a more obvious dissimilarity than that observable between the Corinthian and Composite capitals, ought to occasion a formal distinction.

The Corinthian entablature differs little from that of the Ionic, except in the cornice being made richer and deeper, and the number of its members increased, in order to harmonise with the deeper capital of the columns. One of the features peculiar to it is the series of modillions or small brackets supporting the corona, besides which there are frequently dentils also; sometimes again both are omitted, although there is much ornament in other respects. Indeed, the examples of this order vary so much, not in their cornices alone, but numerous other particulars, that we cannot refer to them here, and shall therefore mention only the three principal ones, viz. the Corinthian of the Pantheon at Rome, of Jupiter Stator and the Temple at Tivoli. The

first of these has been copied in the portico of St. Martin's, which, with its elevated pediment and wide intercolumns, conveys sufficient idea of the Roman style as contrasted with that of the Greeks, which is shown in the adjacent portico of the National Gallery. The second, which is one of the very richest specimens known to us, may be seen in the 'Board of Trade,' at the corner of Downing Street, London; and the third, which is an exceedingly remarkable variety, is that employed in the Bank of England, where it was first introduced. Since then it has been employed by different architects, as in the new building of St. Paul's School; and what is called the Kemble Tavern, at the north end of Bow Street: in both which instances it is fully enriched according to the original.

The Roman Doric and Ionic, of which there are but few examples extant, are both so decidedly inferior to their Grecian originals, that they may well be termed depravations of them. Such as they are, however, they have been adopted and systematized by the Italians, who have limited difference of character almost entirely to difference of ornament, there being very little distinction between them in regard to the form of the column, and the relative proportion between that and the entablature. Compared with the Grecian, the Roman or Italian Doric looks attenuated; the capital is reduced in bulk, and its ovalo is but an insignificant substitute for the Greek echinus. The character and proportions of the entablature are as much altered as those of the column, and the cornice made considerably lighter, a shallow corona being substituted for the Greek one, and additional mouldings introduced beneath it. The Ionic has been equally deteriorated by the Romans and their Italian followers; especially in the capital, the volutes of which are exceedingly small, and not only insignificant in size, but harsh and devoid of grace, harmony, and variety, in their forms. Scamozzi and many other modern architects have placed the volutes diagonally, after the manner of the angular volute in the extreme columns of a portico; but the contours themselves are so inelegant, that the effect is very different in one case from what it is in the other. Modern architects have, again, very frequently employed for this order a convex or pulvinated frieze, as it is called, which has no propriety, and little more of beauty to recommend it: an instance of such frieze, as well of the Italian Ionic generally, and its defects above noticed, occurs in the Banqueting House, Whitehall, a work once extolled as a chef-d'œuvre of architecture, but now regarded rather as a curiosity.

Of what is called the Tuscan order, there are no authentic examples to enable us to decide what it really was; but as laid down by writers of the Italian architectural schools, it is no more than a simpler variety of the Doric, with unfluted columns, and without triglyphs. The absence of the latter distinguishes, not very favourably, the entablature of the lower order in the New Buckingham Palace; consequently, if any distinction is to be made at all, that example may as justly be termed Tuscan as Doric. The portico of St. Paul's, Covent Garden, professes to be Tuscan, and answers very well to the idea of not only a plainer, but a more rude and unpolished Doric, not otherwise distinct from that style than as being less mature and complete. Or, if the degree of dissimilarity observable between the two justifies the distinction claimed for the Tuscan, or untriglyphed Doric, we ought in consistency to invent some specific appellation for the Italian voluted order with a pulvinated frieze, which bears no more than a nominal affinity to that of the Erechtheion.

If the Romans deteriorated the two Greek orders, and brought to perfection a third, of which we meet with little more than the rudiments (as contained in foliaged capitals) among Grecian remains, they likewise, by their extensive application of the arch, materially altered the system of building, and obtained greater variety, though generally at the expense of consistency. Columns frequently became no more than ornaments attached to the face of piers which support arches; while the introduction of successive tiers of arches led to the practice of *supercolumniation* (or placing order over order). The arch, again, was employed, not merely to cover apertures in walls, but was used continuously between two walls, so as to form a vaulted ceiling, whether groined or semicircular. If the area to be so covered was large and of square proportions, the walls and vault were then made circular in plan, whereby the latter [illegible]. Whether the Romans invented or borrowed the arch is a point we have not room to examine, and one which, even if it could be settled beyond all doubt, would be only barren information; but it is certain that the use of it enabled them to erect works on a larger scale, and that too chiefly with brick; and it likewise led to the adoption of circular forms in plans, combined with square ones, thereby giving rise to a variety and complexity in which Greek structures are utterly deficient.

The arch, if at all decorated, springs from a kind of capital crowning the piers, termed impost mouldings; and its archivolt or external facing is fashioned like that of the architrave of the order itself, if there be any. The vertex of the arch has usually a projecting key-stone, which is frequently in the form of a large console supporting the horizontal architrave resting upon, and is so far to be considered as performing the office of a column. Instead of piers, columns alone are sometimes employed, the arch springing either immediately from their capitals, or from a square block made to resemble a detached piece of entablature (as in the interior of St. Martin's, and many of Wren's churches); which latter mode is of the two by far the more objectionable, because, in addition to the incongruity of turning arches upon columns, it renders the misapplication more evident by showing in a mutilated and disconnected form what should be the proper horizontal portion of the order. Besides which, whatever is thus placed between the spring of the arch and the column is necessarily so much taken from the height of the latter, and operates again disadvantageously by reducing the diameter of the columns, and widening the space between them.

Roman domes were generally hemispherical, and made to appear much less than that externally; whereas the Italians and other moderns have not only affected greater loftiness of contour, but have usually elevated the whole dome upon a circular basis termed its tambour, sometimes of greater altitude than the dome itself. The tambour of that of St. Paul's consists of a Corinthian peristyle, surmounted by a balustrade, besides which there is a lofty attic with windows.

In themselves both the dome and arch are beautiful features, and if discreetly and tastefully applied, do not at all contravene with the character of Greek architecture, unless that style is to be confined to the mere temple form, instead of being extended by what it is to be presumed the Greeks themselves would have availed themselves of had they been acquainted with them. The exceedingly beautiful dome of the London University proves that such feature may be made to harmonize with a pure Greek style. In regard to the arch, it is certainly inapplicable to mere doorways and windows: and the two tiers of arches behind the columns greatly impair the effect of the Bourse at Paris; yet where unusually spacious openings are required, it may be applied so as to be at once beautiful and appropriate.

In adopting the Roman orders, the Italians reduced them to strict mechanical rules, making a merit of adhering to one invariable set of proportions for each; yet this has not prevented them from innovating without scruple. Notwithstanding, too, their professed abhorrence of the caprices and anomalies of the Gothic style, they have frequently indulged in fancies the most grotesque, such as curvilinear, broken or twisted pediments, clustered pilasters, broken entablatures, lofty pedestals, columns with square blocks on their shafts, &c., together with much tasteless ornament so applied as either to be insignificant or to produce only confusion. As a sample of such vitiated taste, we may refer to Gibbs's Church in the Strand, near Somerset House, and also to Temple Bar. Somerset House itself, on the contrary, exhibits some of the best features of the Italian style, tolerably free from its alloy; nor can it be denied that where a number of windows are required, that they necessarily characterize the composition full as much as anything else. The Italian style has much to recommend it, if, while we reject its solecisms and vices, we not merely adopt what is good in it, but improve its detail from the best Greek and Roman sources. What it is capable of effecting without employing any of the orders, is shown by the Travellers' Club House, Pall-Mall, which is stamped by a simple and unpretending elegance, far preferable to many bald and insipid imitations of Greek architecture, where the resemblance extends no farther than to the columns. Having thus far explained the scheme of columnar architecture as originally practised by the Greeks, and afterwards successively altered by the Romans and modern Italians, we must leave the reader who is desirous of fuller

information, to consult such works as those of Stuart, and the edition of Chambers, by Gwilt. The two small volumes on Pompeii in the Library of Entertaining Knowledge will also supply much information relative to the public and private architecture of the antients; and there is much also, both artistical and practical, in Loudon's 'Encyclopædia of Architecture.' We have not attempted to give any sketch of the history of the art, and for that reason we have not even mentioned Gothic architecture, which is reserved for a separate article. For representations and other details of the orders, the reader is referred to COLUMN, and other terms are explained as they occur in alphabetical order.

CIVIL LAW. This term is used in different senses. The Romans understood by the expression, 'jus civile,' the law, 'quod quisque populus sibi constituit.' Therefore in this Roman sense civil law may be defined to be the law of any particular nation or state. In place of this original and proper signification of the term, the expression 'municipal law' has very inappropriately been used by some English writers; and civil law, in a more restrained sense, now signifies the law of the antient Romans. [ROMAN LAW.] The term Civil law (the French *droit civil*, the German *Civil-Recht*) is still used, particularly in Germany and France, in another and limited sense, to denote the law given by the competent power of the state for regulating the mutual rights and obligations of the citizens or subjects as private persons; hence the expression 'Civil Code' (*code civil*), and among the Germans, *civil*, or *bürgerliches Gesetzbuch*. [CODIFICATION.] German lawyers therefore say that civil law is a part of private law (*privat-recht*). In this sense civil law is opposed to other branches of law, as for example, to criminal law, ecclesiastical law, &c.

CIVIL LIST, as the words imply, was formerly the name given to the list of all the expenses of the civil government of the country, or of all the heads of public expenditure, excepting those of the army, the navy, and the other military departments. Originally in this country all the expenses of the government, the military expenses not excepted, were comprehended in one general list, and defrayed out of what was called the royal revenue. For a considerable period after the Conquest the royal revenue was derived from the rents of the crown-lands, and from other sources which were at the command of the crown through the exercise of the prerogative. Both the collection and the expenditure of the whole were under the uncontrolled management of the king. Even when at a later period the greater portion of the expenses of the government came to be granted by parliament in the form of supplies, the entire expenditure was still left with the crown, the supplies being either voted for no specific purpose, or when it was otherwise, no responsibility as to the application of them being enforced.

This state of things continued to the Restoration. A distinction was then made between the military expenses of the government, or those occasioned by the wars in which the country might be involved, and which were considered of the nature of extraordinary expenses, and those incurred in the maintenance of the ordinary establishments of the country. The revenues appropriated to the latter were called the hereditary or civil-list revenues, and were provided for partly from the crown lands that remained unalienated, and partly from certain taxes imposed by parliament expressly for that purpose during the life of the reigning king. The civil list thus obtained amounted, during the reign of William III., on an average of years, to the annual sum of about 680,000*l*. Out of this sum were paid the expenses of the royal household, of the privy purse, of the maintenance and repairs of the royal palaces, the salaries of the lord-chancellor, of the judges, of the great officers of state, and of the ambassadors at foreign courts; the incomes of the members of the royal family, and many other pensions, the secret service money, and a long list of other claims. The interest of the national debt however was never defrayed from the sum allotted for the civil list. In the reign of Queen Anne the civil list remained of nearly the same amount as in that of King William, the principal taxes appropriated to it being an excise of 2*s.* 6*d.* on the barrel of beer, which produced about 286,000*l*. per annum, a tonnage and poundage duty which produced about 257,000*l*., and the profits of the post-office, from which about 100,000*l*. was derived. At the commencement of the reign of George I., 700,000*l*. a year was voted by parliament for the civil list, and certain taxes, as usual, were appropriated to that branch of the public expenditure. The same duties were, on the accession of George II., continued for that reign, it being provided that if they did not produce 800,000*l*. per annum, the deficiency should be made up by parliament, and that any surplus beyond that sum should be retained by the crown. At the accession of George III. the sum of 800,000*l*. was again voted by parliament for the civil list, but no particular taxes were set apart to provide that revenue. In the course of a few years however a large amount of debt had accumulated in this department, and to pay it off, two sums amounting together to considerably above 1,000,000*l*. were voted by parliament in 1769 and 1777. In the latter year also the civil-list revenue was permanently raised to 900,000*l*. This however did not prevent further deficiencies, which were again made good by parliament in 1784 and 1786, to the extent of about 270,000*l*. In 1780 Mr. Burke brought in his bill for the better regulation of the civil list, which, although it was greatly mutilated before it passed into a law (in 1782), abolished several useless offices, and effected some reduction of expenditure. According to the report of a committee of the House of Commons which sat upon the subject of the civil list in 1802, the total average annual expenditure in that branch since 1786 had been 1,000,167*l*., under the following heads:—royal family in all its branches, 209,988*l*.; great officers of state, 33,279*l*.; foreign ministers, 80,526*l*.; tradesmen's bills, 174,697*l*.; menial servants of the household, 92,424*l*.; pensions, 114,817*l*.; salaries to various officers, 76,013*l*.; commissioners of the treasury, 14,455*l*.; occasional payments, 203,964*l*. At this time another sum of above 990,000*l*. was voted by parliament to pay the debts on the civil list; and in 1804 the civil-list revenue was raised to 960,000*l*. In 1812 it was further augmented to 1,080,000*l*.; besides which, annuities to the amount of 260,000*l*. were then paid to the different branches of the royal family out of the consolidated fund. Another committee of the House of Commons inquired into the subject of the civil list in 1815, and it was upon the report made by this committee that the amount of the civil list was settled, on the accession of George IV., at 850,000*l*. per annum, 255,000*l*. of annual charge being at the same time transferred from this branch to other funds. It was calculated that the distribution of this sum would be under the following heads. 1. His Majesty's privy purse, 60,000*l*. 2. Allowances to the lord-chancellor, judges, and speaker of the House of Commons, 32,956*l*. 3. Salaries, &c., of his Majesty's ambassadors and other ministers, salaries to consuls, and pensions to retired ambassadors and ministers, 226,950*l*. 4. Expenses, except salaries, of his Majesty's household in the departments of the lord steward, lord chamberlain, master of the horse, master of the robes, and surveyor-general of works, 209,000*l*. 5. Salaries in the above departments, 140,700*l*. 6. Pensions limited by Act 22 Geo. III., c. 82, 95,000*l*. 7. Salaries to certain officers of state, and various other allowances, 41,306*l*. 8. Salaries to the commissioners of the treasury and chancellor of the exchequer, 13,822*l*. 9. Occasional payments not comprised in any of the aforesaid classes, 26,000*l*. The crown was left besides in the enjoyment of the hereditary revenues in Scotland, amounting to about 110,000*l*. per annum; and also of a civil list for Ireland, of 207,000*l*. On the 15th of November, 1830, immediately after the accession of his present Majesty, William IV., Sir Henry Parnell carried in the House of Commons a motion for appointing a select committee to inquire into the civil list. The chief object proposed was the separation of the proper expenses of the crown from all those other charges which still continued to be mixed up with them under that title. The consequence of the success of this motion (besides the overthrow of the Wellington administration and the introduction of the Reform Bill) was another report, upon which was founded the Act 1 Will. IV., c. 25, by which the present civil list was settled. The committee having recommended that the civil-list charges should be confined to expenses proper for the maintenance of their Majesties' household, it is enacted that the sum of 510,000*l*. be granted to his Majesty, under the following classes. 1. For their Majesties' privy purse, 110,000*l*. 2. Salaries of his Majesty's household, 130,300*l*. 3. Expenses of his Majesty's household, 171,500*l*. 4. Special and secret service, 23,200*l*. 5. Pensions, 75,000*l*. The Irish separate civil list is also discontinued; and it is ordered that the Scotch hereditary revenues, as well as the

droits of admiralty, and the 4½ per cent. duties, shall be paid into the exchequer for the use of the public. His Majesty also retains the revenues of the duchies of Lancaster and Cornwall, which are considered to be the hereditary revenues, not of the crown, but of the dukedoms of Lancaster and of Cornwall; the former of which is permanently annexed to the crown, and the latter belongs to the crown when there is no Prince of Wales. No account of the amount of these revenues has ever been laid before Parliament; but it is understood not to be considerable. In his speech on the Economical Reform in 1780, Mr. Burke said, 'Every one of those principalities has the appearance of a kingdom, for the jurisdiction over a few private estates; and the formality and charge of the Exchequer of Great Britain, for collecting the rents of a country squire. Cornwall is the best of them; but when you compare the charge with the receipt, you will find that it furnishes no exception to the general rule. The Duchy and County Palatine of Lancaster do not yield, as I have reason to believe, on an average of twenty years, 4000*l.* a year clear, to the crown. As to Wales, and the county palatine of Chester, I have my doubts whether their productive exchequer yields any returns at all.' 'There is no real reduction in this arrangement,' says Sir Henry Parnell (' on Financial Reform,' 4th edit., p. 205), 'below the grant to his late Majesty; for whatever appears to be a reduction, has been produced by a transfer of charge from one head to another of the old civil list. The chief difference in this arrangement from the former consists in the transfer of about 460,000*l.* a year from the civil-list to the consolidated fund, and in providing for the gradual reduction of the pensions to 75,000*l.* a year.' It is evident from this account, that what is now called the civil-list has no proper claim to that title. (See Sir John Sinclair's *History of the Revenue;* Colquhoun's *Wealth, &c. of the British Empire;* Sir H. Parnell on *Financial Reform;* and *Reports of Committees of the House of Commons in* 1802, 1803, 1804, 1808, 1812, 1813, 1815, 1819, and 1831.)

CIVILIZATION. The majority of mankind pay an habitual veneration to words, and this species of adoration is not exempt from fanaticism. It would not be difficult to find men who would willingly suffer any privations and tortures, and even death, for the sake of certain words. If you tell them (what indeed few people seem to comprehend) that words are but signs which give consistency and permanence to our ideas, and if you ask them what the ideas are which these words of such frequent occurrence in their conversation or writings are designed to express, you may be convinced that the art of speaking with propriety is, as it has been well remarked, inseparable from the art of thinking correctly, and that it is almost always for want of attaching the same ideas to the same words that men misunderstand each other, dispute, and sometimes come to blows.

The words civilization, education, and religion, with a multitude of others, are among those expressions which are so often used without any clear, definite, or precise ideas being attached to them; yet there are no words that require to be more thoroughly analyzed.

The meaning of a word is often formed by degrees, and in connexion with facts and observation. As soon as a particular fact presents itself to our notice which appears to have a specific relation to a known term, it becomes immediately incorporated with it; and hence the meaning of every term gradually extends itself, and finally embraces all the various facts and ideas which seem properly to belong to it. On this account, there is more depth as well as correctness and accuracy in the usual and ordinary meaning of complex terms than in any definitions which can be given of them, notwithstanding the latter may appear at first sight to be more strict and precise. In the majority of instances scientific definitions are much too narrow, and owing to this circumstance they are in reality frequently less exact than the popular meaning which is given to terms; it is therefore in its popular and ordinary signification that we must seek for the various ideas that are included in the term Civilization.

Now, the first fact which this word seems to carry with it (and many proofs of it could easily be given) is that of a progressive movement, of a gradual development, and a tendency to amelioration or perfection. It always suggests the idea of a community which is advancing, not in disorder or without design, rule, or guide, but cautiously, methodically, and with distinct and clear views of the objects which it seeks to attain; progress, continual improvement, advancement towards perfection (although the latter is obviously unattainable by man), is therefore the fundamental idea contained in our notion of the term Civilization.

Then as to this progress, improvement, and gradual advancement, to what do they apply? The very etymology of the word answers the question in the clearest and most satisfactory manner. From this we learn that it does not contemplate the actual number, power, or wealth of a people, but their *civil* condition, their social relations, and intercourse with each other. Such then is the first impression which arises in our mind when we pronounce the word *Civilization.* It seems to represent to us at once the greatest activity and the best possible organization of society; so as to be productive of a continual increase, and of a more equable distribution of its wealth and power among its members, whereby their absolute and relative condition is kept in a state of constant improvement.

But is this all? Does this explanation exhaust the entire and full meaning of the word? Does it contain nothing beyond this? It is as though we were to ask whether the human race were no more than a vast ant-hill, a community bent upon nothing but mere order and the supply of its physical wants; and where, in proportion as the labours were great and the results of them fairly apportioned, the desired end was fully accomplished.

Now great as is the influence which a well-planned organization of civil society must necessarily have upon the happiness of the human race, the term Civilization seems to convey something still more extensive, more full and complete, and of a more elevated and dignified character, than the mere perfection of the social relations, as a matter of order and arrangement. In this other aspect of the word it embraces the development of the intellectual and moral faculties of man, of his feelings, his propensities, his natural capacities, his tastes, and his ideas.

But here we touch upon the question of education, which is the very soul of civilization, which is talked of and lauded by all, though in reality understood by few.

Education, which is the result of a well-ordered social arrangement, and also its perfector and conservator, an education which shall give to every member of the community the best opportunities for developing the whole of his faculties, is the end which civilization, or a society in a state of continued progress, must always have in view. But this subject requires a separate and a much more extensive investigation.

The fundamental ideas, then, contained in the word Civilization are—the continual advancement of the society in wealth and prosperity, and the improvement of the man in his individual capacity.

When the one proceeds without the other, it is immediately felt that there is something incomplete and wanting. The mere increase of national wealth, unaccompanied by a corresponding knowledge and intelligence on the part of the people, seems to be a state of things premature as to its existence, uncertain in its duration, and insecure as to its stability. We are unacquainted with the causes of its origin, the principles to which it can be traced, and what hopes we may form of its continuance. We wish to persuade ourselves that this prosperity will not be limited to a few generations, or to a particular people or country, but that it will gradually spread, and finally become the inheritance of all the people of the earth. And yet what rational expectation can we entertain of such a state of things becoming universal? It is only by means of education, conducted upon right principles, that we can ever hope to see true national prosperity attained, and rendered permanent. The development of the moral and intellectual faculties must go hand in hand with the cultivation of the industrious arts; united, they form the great engine for civilizing the world.

In fact, without the union of these two elements, civilization would stop half way; mere external advantages are liable to be lost or abused without the aid of those more refined and exalted studies which tend to improve the mind, and call forth the feelings and affections of the heart. In a word, civilization consists in the progressive improvement of the society considered as a whole, and of all the individual members of which it is composed.

CIVITA, an Italian appellation derived from the Latin civitas, 'a town,' forms part of the name of several Italian

towns, such as Civita Castellana, a town in the province of Viterbo, near Rome, with a citadel and a bishop's see, and 1800 inhabitants; also Civita Ducale and Civita di Penne in the Abruzzo, &c. There are several places called Civitella or little town, the most known of which is Civitella on the Tronto, a fortified place on the frontiers of Abruzzo, towards the papal province of the Marches. There is also Cividal (a corruption of Cività) in the Friuli.

CI'VITA VE'CCHIA, a town and sea-port in the Papal State, in the Delegazione, or province of Viterbo. Its harbour is formed by two piers of marble blocks first raised by Trajan, who had a country residence here called Centum Cellæ, and afterwards restored under the popes. At the entrance between the extremities of the two piers is a small island or breakwater formed of large pieces of rock thrown into the sea, under the reign of the same emperor. Pliny the younger (*Epist.* 31) describes the manner in which the breakwater and the piers were made. There is from 14 to 18 feet depth of water in the harbour, which is the only safe one on the south coast of the Papal State, and is frequented by about 1000 vessels of various sizes, most of them coasting vessels, in the course of the year. There is a lazzaretto for ships coming from infected countries. There are also docks and a prison for galley-slaves. The lighthouse and the citadel were built by Michel Angelo. The present town of Civita Vecchia was built by Pope Leo IV., and is regularly fortified. The streets are regular and the houses well built. The town has a cleanly and bustling appearance. The air, although not very good in summer, is not altogether unwholesome, but the country around is subject to the malaria, and has a desolate appearance like the rest of the lowlands on this coast. The population of Civita Vecchia is about 8000 (Calindri, *Saggio Statistico*). It has a military governor, and is subject in civil matters to the delegate residing at Viterbo. Civita Vecchia is 36 miles north-west of Rome.

CLACKMANNAN, a very small county in the eastern part of Scotland; bounded on the south by the river Forth, on the north and west by Perthshire, and on the east by Perthshire and Fifeshire. Its greatest length from N.W. to S.E. is about nine miles, and its width from N.E. to S.W. about eight miles. The area is 48 square miles, or 30,720 acres, which is divided into four parishes. The surface in the southern part, adjacent to the Forth, consists of level alluvial tracts, which are very productive in corn, and contain good pastures. Towards the northern extremity the land rises gradually into the Ochill Hills, which traverse the county from S.W. to N.E., and furnish some pasturage for sheep. The woodlands cover about 500 acres, and at least 2000 acres are laid out in plantations. Agriculture is in a state of continual improvement; lime manure and thrashing machines are used on almost every farm. The highlands in the N.E. of the county yield an abundant supply of several valuable minerals. The annual produce of coal is about 130,000 tons. There are also quarries of freestone, granite, and iron-stone which contains from 20 to 30 per cent. of iron. Silver, lead, copper, cobalt, antimony, arsenic, agates, pebbles, and topazes, have been found, but not in sufficient quantities to defray the expense of working. Several excellent roads intersect the county, and there are numerous creeks along the Forth which are used by the fishermen. The chief harbours are those of the two principal towns of the county, Alloa and Clackmannan. The population in 1831 was 14,729. Clackmannan and Kinross together send one member to the House of Commons.

CLA'DIUS, a genus of Hymenopterous insects of the family Tenthredinidæ. Technical characters:—Antennæ about the same length as the body, ciliated beneath, and nine-jointed; the two basal joints short, the third joint with a protuberance beneath at the base, and a branch thrown out from the upper side at the apex; the fourth and fifth have likewise the last-mentioned process; and in the sixth and seventh it is rudimentary. In the female all these processes are wanting, excepting the one on the underside of the third joint. Wings with one marginal and three sub-marginal cells; tarsi simple.

Cladius difformis, when the wings are expanded, measures in width about one third of an inch: it is black, with the tibiæ and tarsi pale yellow. This species may be considered the type of the genus; it inhabits this country, but is not common.

CLADOBATES. [TUPAIA.]

CLAGENFURTH, a circle in the eastern division of the Austrian duchy of Carinthia (formerly Lower Carinthia), and in the north-east part of the kingdom of Illyria, is bounded on the north and east by Styria, and contains about 1500 square miles, 9 towns, 14 market-towns, 1616 villages, and 27,000 houses. Although very mountainous, and traversed by the Alps both in the interior and along the frontiers, its valleys are extremely fertile, and produce corn, fruits, and flax. The declivities of the mountains are clothed with rich woods. There are above 732,121 yochs (about 488,000 acres) of arable land. The Drave in its course through this circle receives the Glan, Gurk, Lavant, Fella, Wiesbach, and many smaller mountain streams. The largest lake is the Worth, or Lake of Clagenfurth, which is about ten miles in length, and supplies the canal leading to the chief town, Clagenfurth. The principal mountains of the southern chain are the high Loibel (4300 feet) and the Great Predl of the northern chains, the Eisenhut, and the Gruftkogel. The air is pure and salubrious, but in the mountainous districts Cretins, or as they are here called Fexes, are frequently met with. Minerals are very abundant, especially silver, lead, and iron. According to an average return of ten years, the annual produce of silver is 155 marks; lead, 982 cwt.; litharge, 165 cwt.; iron, 9730 tons; alum, 339 cwt.; quicksilver, 33,600 lbs. (according to others as much as 168,000 lbs.) Next to agriculture, mining and smelting are the most important resources of the inhabitants; there are in this circle 1 silver, 1 copper, 3 lead, 4 iron mines, 2 quarries of marble, and 2 coal-pits, besides numerous smelting houses, &c. The population in 1813 was 162,759: at present it amounts to about 180,000 inhabitants.

CLAGENFURTH (in Carinthian, Zelany), the capital of the duchy of Carinthia, in the circle of Clagenfurth, is situated on the river Glan, in an extensive plain, bounded on the south by the snow-topped mountains of Carinthia, and at an elevation of 1554 feet above the sea. It is the residence of the bishop of Gurk, and the seat of the court of appeal for the province of Laibach. Its modern name has been sometimes derived from Claudia or Claudisorum, from the emperor Claudius—hence Cladenfort, then Clagenfort, and subsequently its present designation. The town was the property of the crown till 1518, when the emperor, Maximilian I., gave it to the state of Carinthia for the purpose of erecting a fortress for the defence of the country. Soon afterwards the canal from the lake Worth, or lake of Clagenfurth, to the town (nearly three miles in length) was opened at the expense of the citizens, and the fortifications extended as the town was enlarged—especially after the great conflagrations in 1535, 1723, and 1796, to which the town is indebted for its present fine and regular appearance. The ramparts, gates, and ditches were levelled in 1809. It is in the form of a square, and is adorned with many handsome public buildings, the palaces of Princes Rosenberg and Porcia, and of the prince bishop of Gurk; which last contains fine collections of paintings, minerals, &c. There are five public squares, three of which are embellished with monuments—one a statue in lead of Maria Theresa, and an obelisk erected by the bishop of Gurk in honour of the Emperor Francis I., on occasion of the peace of Presburg. The other buildings of note are the Burg and the house of assembly, the law courts, the lyceum and library, a gymnasium, and one theatre. There is also an Ursuline convent, a normal school, an agricultural society, two hospitals, infirmaries, a lunatic asylum, a house of industry, a workhouse, and house of correction. Of the seven churches in the town, the civic church is remarkable for its fine bold tower, the gallery of which commands an extensive prospect over the town and its picturesque environs. The population is about 9300; many of whom are engaged in manufactures, particularly fine woollens, silks, and white lead. There is also a considerable transit trade. 46° 36′ N. lat., 14° 20′ E. long. In the vicinity are the baths of St. Leonhard, 3540 feet above the sea, at the foot of the chain which separates the circle of Clagenfurth from that of Villach: they are cold, and excite an appetite.

CLAIRAUT, ALEXIS CLAUDE (sometimes spelt Clairault; we have taken the spelling from the title of his own works), was born at Paris, May 7, 1713. His father, John Baptist Clairaut, was a teacher of mathematics. The early proficiency of the son in mathematics is better attested

than in any other similar case, by the actual appearance of his celebrated treatise on Curves of Double Curvature, in 1731, when he was eighteen years of age, accompanied by the usual official recommendations, which prove that it was ready for the press two years before: it is said to have been begun when he was only thirteen years old. He read the Conic Sections of De L'Hôpital, and also the 'Infiniments Petits' of the same author, when he was only ten years old; a fact which we should have forborn to state, had it not been for the evidence contained in the treatise just cited, and in this fact, of public notoriety, that at the age of twelve years he presented a memoir on some remarkable curves to the Academy of Sciences, and removed all doubts as to its authorship by his personal explanations.

In 1731, being then under the legal age, Clairaut was admitted into the Academy of Sciences. He formed an intimate acquaintance with Maupertuis, and commenced at this period his researches on the figure of the earth. In 1735 he accompanied Maupertuis, Camus, Lemonnier, &c., in their expedition to Lapland, for the purpose of measuring a degree of the meridian. (See the articles connected with the Figure of the Earth.) This measure has frequently been considered as of little value: it must however be remarked, that such an opinion has been formed on the strength of discrepancies which were sufficiently apparent to the measurers themselves, and which caused them to review all their operations; as also, that circumstances connected with local attractions are fully sufficient to explain the whole difficulty. The work of Clairaut on the Figure of the Earth appeared in 1743, and was reprinted in 1808. It contains the remarkable discovery which is usually called Clairaut's Theorem. Considering the earth as an elliptic spheroid, it should seem that the variation of gravity on the surface would depend upon the law of density of the interior strata. But Clairaut showed that this variation is altogether independent of the law of density, and may be deduced from a knowledge of the form of the exterior surface. In this theorem, the second and higher powers of the eccentricity are rejected. Mr. Airy (in an early volume of the 'Cambridge Transactions') has shown that it remains true when the higher powers are taken into account.

In 1750 Clairaut gained the prize of the Petersburg Academy for his paper on the Theory of the Moon. It is more essential for us here to state the position which he occupies among the successors of Newton, than to enter into details which are better suited to other articles. Newton had left one prominent point of the lunar theory altogether unexplained by his theory of gravitation, namely, the motion of the lunar apogee, of which, though able to assign a sufficient reason for the phenomenon of progression, he was not able to deduce more than half the quantity of the phenomenon. Clairaut at first concluded that the law of gravitation was incompletely expressed; but further consideration, and more extensive application of analysis, showed that the whole motion was a necessary consequence of the Newtonian supposition of mutual attraction. In two points of view, therefore, as the first who applied what is now called the modern analysis to the problem of the lunar motion, and as the first who added an unexplained phenomenon to the theory which Newton had left, Clairaut stands in a conspicuous position.

Clairaut was the first who applied the Newtonian theory to the motion of comets, in reference to the perturbation of their motions by the attraction of the planets. In 1757 astronomers began to expect the fulfilment of Halley's prediction relative to the comet whose appearance has now once more excited public curiosity. Lalande proposed to Clairaut to undertake the actual computation of the quantity of Jupiter's action on the comet during a revolution, and offered his assistance in the drudgery of the work. For the manner in which this enormous labour was executed the reader may consult the article 'Halley's Comet,' i the 'Companion to the Almanac for 1835.' The resu was that Clairaut's prediction came very near the truth: the return of the comet was at first placed in November, 1758; in that month Clairaut predicted that it would arrive at its nearest point to the sun about April 13, 1759, stating that he might possibly be wrong by a month. The observed perihelion of the comet was on the 13th of March. The error would have been considerably less if the existence of Uranus, and a more correct value of the mass of Saturn, had been known.

The figure of the earth, the theory of the moon, and Halley's comet, are the three prominent points on which the fame of Clairaut rests. We might mention his work on Geometry, drawn up, it is said, for the use of Madame du Chastellet: his Elements of Algebra, remarkable at the time for the abandonment of the dogmatical form in which it was customary to write elementary works; and many papers in the Memoirs of the Academy, containing several remarkable discoveries in pure mathematics. But we shall pass on to some notice of his career in connexion with that of D'Alembert. These two great men were rivals in their scientific labours, and though their disputes never passed the bounds of courtesy, the life of each, with respect to the other, was either armed truce or open war. The characters of the two were essentially opposite: Clairaut was a man of the world, of high polish, and who took great care never to offend the self-love of any one: D'Alembert was blunt and rude, though essentially well-meaning and kind; if we may use such a colloquial phrase, he 'stood no nonsense;' *j'aime mieux être incivil qu'ennuyé* was his avowed maxim. Clairaut was always in the world, desirous to shine, and to unite the man of fashion with the philosopher, of all which D'Alembert was the reverse. The attacks usually came from the latter, confined entirely to the writings of his opponent: and he was frequently right, being a thinker of a more safe and cautious order than Clairaut, who was more than once too hasty. For instance, when Clairaut took the whole revolution of Halley's comet, or more than fifty years, as the unit of which the error committed by him should be considered as a fraction, D'Alembert asserted that the magnitude of the latter should be compared, in the estimation of precision, with the difference between two successive revolutions, or about a year and a half. Later analysts, and Laplace in particular, have considered that D'Alembert was right. The preceding comparison is drawn from Bossut (*Hist. des Math.*), who was the personal friend and the decided eulogist of both. He adds that the polished character of Clairaut procured him an *existence* and a consideration in the great world which talent alone would not have sufficed to gain; and more than insinuates that dissipation destroyed his constitution. However this may be, Clairaut died at Paris, May 17, 1765, at the age of fifty-two. He was never married: his father (who survived him a short time) had a very numerous family, of whom only one daughter survived. (See the Eloge in the Memoirs of the Academy; the Life, by Lacroix, in the *Biog. Univ.;* and the work of Bossut, above cited.)

The works of Clairaut, independently of Memoirs presented to the Academy, are—1. 'Recherches sur les Courbes à double Courbure;' Paris, 1731. 2. 'Elémens de Géométrie;' Paris, 1741; and various editions up to 1765. 3. 'La Figure de la Terre déterminée' &c. (Account of the Lapland Measure, by Maupertuis, Clairaut, &c.); Paris, 1738; in Latin, by Zeller; Leipzig, 1742. 4. 'La Théorie de la Figure de la Terre;' Paris, 1743; again in 1808. 5. 'Elémens d'Algèbre;' Paris, 1746; again in 1760 ('très estimée,' Lacroix); again in 1797 and 1801 (marked sixth edition), by Garnier, with a Preliminary Treatise on Arithmetic. 6. 'Théorie de la Lune;' St. Petersburg, 1752, (prize essay) second edition 1765. 7. 'Tables de la Lune,' &c.; Paris, 1754, republished with (6.) in 1765. 8. 'Théorie du Mouvement des Comètes;' Paris, 1760; the account of the great process relative to Halley's comet. D'Alembert wrote against this in the 'Journ. Encycl.,' February, 1761; Clairaut replied in the 'Journ. des Sav.,' June, 1761. 9. 'Recherches sur la Comète,' &c., St. Petersburg, 1762, (Supplement to 8). 10. 'Explication des Principaux Phénomènes, &c.;' compiled by Madame du Chastellet from Clairaut's instructions, and printed at the end of her translation of Newton; Paris, 1759. [CHASTELLET, MADAME DU.]

CLAIRVAUX, a small town in France, in the department of Aube, and on the left bank of the river Aube. It is surrounded by woods and mountains, which were once the property of the Cistertian abbey, one of the most antient and renowned of that order. This abbey was founded, A.D. 1115, by a detachment of the religious of the abbey of Cîteaux, the chief establishment of the order, under St. Bernard. The possessions of the abbey, which comprehended the wild and once uncultivated valley of Absinthe, in which it was situated, were originally due to the liberality of Hugues, count of Troyes, the first benefactor of the establishment. They were augmented by others to such an extent, that at the time of St. Bernard's death (A.D. 1153) the abbey of

Clairvaux contained five hundred monks, or, according to other statements, seven hundred. In the middle of the last century there were only about fifty or sixty monks, twenty lay brethren, and forty servants, or thereabouts. The abbey had depending upon it, previous to the French revolution, eighteen regular abbeys of men and twenty-eight of women, and forty-one abbeys held in commendam, all in France; besides forty abbeys, whether of monks or nuns, in foreign countries. The revenue of the monastery was 90,000 livres, or about 3750*l*. The church was deemed a chef-d'œuvre, and there was a gallery with some good paintings. The abbey is now used as a house of correction, in which 2000 prisoners are employed in the manufacture of different stuffs. A famous tun, 'the tun of St. Bernard,' said to contain eight hundred tons of wine, is still preserved.

Glass and paper are made in the town of Clairvaux, beer is brewed, and iron is wrought. (Expilly; Reichard; *Dictionnaire Universel de la France*.)

CLAKIS. [BERNICLE GOOSE.]

CLAMECY, or CLAMENCY, a town in France, in the department of Nièvre, at the junction of the Beuvron with the Yonne, 110 miles S.S.E. of Paris in a direct line, in 47° 27′ N. lat., and 3° 30′ E. long. The population of Clamecy amounted in 1832 to 4926 for the town itself, or 5539 for the whole commune. Considerable trade is carried on, and the town is considered wealthy in proportion to its size. Earthenware and woollen cloth are the chief manufactures; to which we may add leather, paper, and gloves. The woollens are manufactured of the wool grown in the neighbourhood, mingled with that of Bourgogne. The surrounding country is fertile in grain and pasturage. Clamecy is the place from which the Yonne is employed for floating timber down to Paris; the navigation does not commence till near Auxerre, which is many miles lower down the stream.

Clamecy is the capital of an arrondissement, which contained, in 1832, 70,381 inhabitants.

CLAN, in Gaelic *Clann*, which is said to signify children or descendants. The word has been long adopted as English. Milton says,

'They around the flag
Of each his faction, in their several clans,' &c.
Par. Lost, ii 901.

The clans of the Highlands of Scotland are families, or rather tribes, all the members of which bear the same surname, and are supposed to be descended from a common ancestor, of whom the chief of the clan is the lineal representative. 'Being divided,' says Camden, speaking of the Scotch Highlanders, 'into families, which they call clans, what with plundering and murdering, they commit such barbarous outrages, that their savage cruelty hath made the law necessary which enacts, that if one of any clan hath committed a trespass the rest shall repair the damage, or whoever of them is taken shall suffer death.' Some clans however are divided into several branches, each of which has its particular surname. According to Colonel Stewart, in his 'Sketches of the Character, Manners, and Present State of the Highlanders of Scotland' (2 vols. 8vo. Edinb. 1822), p. 24, this surname, peculiar to the branch, is called the *bun sloine*, that is, the genealogical surname, being derived from the Christian name or other designation of the ancestor of the branch. It is the name generally used in common conversation; but every Highlander in writing his signature, and also for the most part when he has to mention another person in writing, uses the name which is common to the whole clan. Most of the Highland noblemen and gentlemen have designations peculiar to them as chiefs of their clans, which in their own country no feudal titles or distinctions, however exalted, are allowed to efface. 'Besides his ordinary name and surname,' says Sir Walter Scott (note to *Lady of the Lake*, canto ii.), 'which were chiefly used in the intercourse with the lowlands, every Highland chief had an epithet expressive of his patriarchal dignity as head of the clan, and which was common to all his predecessors and successors, as Pharaoh to the kings of Egypt, or Arsaces to those of Parthia. This name was usually a patronymic, expressive of his descent from the founder of the family. Thus the duke of Argyle is called Mac Callum More, or the *Son of Colin the Great*. Sometimes however it is derived from armorial distinctions, or the memory of some great feat: thus Lord Seaforth, as chief of the Mackenzies, or Clan-Kennet, bears the epithet of Caber-Fae, or *Buck's-Head*, as representative of Colin Fitzgerald, founder of the family, who saved the Scottish king when endangered by a stag.'

Although the chieftainship of the clan now descends regularly from father to son or other heir male, there can be little doubt that in antient times the custom of tanistry prevailed among the Scottish Highlanders, as it did down to a comparatively recent date among the Irish. [BREHON LAWS, p. 383.]

The common prefix of the Scottish patronymics of clans, as every body knows, is *Mac*, that of the Irish *O'*—both signifying son, or at least descendant. But many Irish names also begin with Mac, and some with the synonymous Norman Fitz, the same word with the modern French *Fils* and the *vitz* or *witz* used as an affix in the same sense by the Russians. Several of the Scottish clans however have surnames in which the common prefix does not appear—as, for instance, the Stewarts, the Gordons, the Robertsons, the Camerons, the Campbells, the Chisholms. Several of these are generally understood not to be of Celtic descent. Indeed the tribes inhabiting the southern borders of Scotland, whose connexion with and dependence upon their chiefs used to be nearly the same with what prevailed in the Highlands (see the *Introduction to Scott's Minstrelsy of the Scottish Border)*, are often also familiarly spoken of as clans. Scott, in the battle canto of Marmion, says,

'Against them come,
Of gallant Gordons many a one,
And many a stubborn Badenoch man,
And many a rugged Border clan,
With Huntley and with Home.'

And the old Scottish statutes, passed in the sixteenth century for regulating the Borders, speak of 'clans having captains and chieftains, whom on they depend, oft-times against the wills of their landlords.' 'Of course,' says Scott, referring to acts passed in 1574 and 1587, 'these laws looked less to the feudal superior than to the chieftain of the name, for the restraint of the disorderly tribes; and it is repeatedly enacted, that the head of the clan should be first called upon to deliver those of his sept who should commit any trespass, and that on his failure to do so he should be liable to the injured party in full redress.' (*Introduction to Border Minstrelsy*.)

According to Colonel Stewart (*Sketches*, &c., vol. i.), the Gaelic clans of Scotland occupy the counties of Sutherland, Caithness, Ross, Inverness, Cromarty, Nairn, Argyle, Bute, and the Hebrides, with part of Moray, Banff, Stirling, Perth, Dumbarton, Aberdeen, and Angus. He has given a map of Scotland, in which the locality of each clan is marked; and in the second and third sections of his work he describes and examines the system of clanship and its consequences. In his second volume, Appendix Q is on the Distinctive Patronymics of the Clans. In Robert Patten's 'History of the Rebellion of 1715' (3rd edit. 8vo. Lond. 1745), pp. 191—199, is given 'A List of the most considerable Chiefs in Scotland, and the number of men they can raise, with an account of their disposition for or against the government,' which includes the clans. 'Note,' says Patten, 'that all the chiefs in Scotland are chiefs of clans, properly so speaking, whether noblemen or gentlemen; but commonly the last only are called the clans, and particularly those of them who live in the north and west Highlands and Isles.' Patten's list may be compared with a 'Memorial on the Military Strength of the Clans,' which Colonel Stewart has printed in his Appendix C, and which he conceives to have been drawn up a short time before the rebellion of 1745 by President Forbes. Bishop Nicolson has printed in his 'Scottish Historical Library' from Bell's MS. 'Introduction to the History of Cumberland,' a catalogue of the chiefs and clans of what was called the west border of the south of Scotland, that in 1547 submitted and gave pledges to Lord Wharton, who had overrun the country, that they would serve the king of England, with the number of followers they could command annexed to the name of each. It has been transferred by Scott to a note on his 'Introduction to the Border Minstrelsy,' along with a list of the east border chiefs who did homage the same year to the duke of Somerset, from William Patten's Diary of the duke's expedition, originally printed in 1548, and reprinted in Dalyell's 'Fragments of Scottish History.'

In Chambers's 'Popular Rhymes of Scotland' (12mo., Edinb. 1826, pp. 246—256) may be found a collection, which the writer, however, admits to be very meagre and defective, of the slogans, or war-cries, of various clans both

of the Highlands and the Borders. On this subject see also Colonel Stewart's Appendix D. In Mr. Chambers's curious volume (pp. 197—246) are collected and illustrated the characteristic epithets proverbially applied to many of the clans and other Scottish families; such as the Gay Gordons, the Greedy Campbells, the Dirty Dalrymples, the Gallant Grahams, the Light Lindsays, the Manly Morisons, the Haughty Hamiltons, the Sturdy Armstrongs, the Saucy Scots, the Gentle Johnsons, the Lucky Duffs, the Setons Tall and Proud, the Wild Macraws, the Handsome Hays, the Trusty Boyds, the Muckle-mow'd Murrays, &c.

No complete history of the Scottish Clans, as far as we are aware, has been compiled. But there are several histories of particular clans, both printed and manuscript. The second part of William Buchanan of Auchmar's 'History of the Antient Surname of Buchanan' (12mo., Glasgow, 1793) consists of a 'Brief Enquiry into the Genealogy and Present State of Ancient Scottish Surnames,' and contains the legendary or traditional history of most of the principal clans. There is also a work entitled 'Antiquity of the Macs, Clans, and Bodotria,' by the Reverend John Lane Buchanan, A.M., missionary minister to the Isles from the church of Scotland, of which we have not been able to find a copy. In a newly established periodical publication, entitled 'Transactions of the Iona Club,' 8vo., Edinb., 1834, &c., consisting of 'Collectanea de Rebus Albanicis,' there is printed (vol. i., pp. 50—63), with a translation and notes, a Gaelic account of the genealogies of the Highland clans, from a MS. which appears to have been written about the year 1440. In his concluding note the editor observes, 'It would occupy too much space here to enter into any detail of the very important effects which this MS. must produce upon the question of the origin of the Highland clans; it will be sufficient to state that it seems to establish three very remarkable facts:—1. The existence at a very early period of a tradition in the Highlands of the common origin of all the Highland clans;—2. The comparatively late invention of many of the traditionary origins of the different clans at present believed;—and 3. The natural relationship of various clans which have hitherto been supposed to be altogether unconnected.'

The system of clanship as it still subsists in the Highlands of Scotland, making allowance for the modifications it has received from the feudalism, in respect to the tenure of property superinduced upon its original purely patriarchal character, is essentially the same state of society that has always prevailed among the wandering Arabs and Tartars of the East. Gibbon's description of the social condition of the Tartars, or, as he calls them, Scythian hordes, in his 26th chapter, would, in great part, suit the state of things in the Highlands, at least as it remained down to the rebellion of 1745. Since that attempt, and the measures which the government was induced to take in consequence of it, the old spirit of clanship has considerably declined.

CLAPPERTON, HUGH, was born in 1788, at Annan, in Dumfriesshire, N.B., where his father was settled as a surgeon and country practitioner. After receiving the rudiments of a plain education, with some instruction in mathematics, he went to sea at the age of thirteen, being bound apprentice in a merchant-ship that sailed between Liverpool and America. After making several voyages he was impressed and sent on board a man-of-war as a common seaman. Fortunately Clapperton had an uncle, a captain of marines, through whose interest with the naval commanders then in commission in the Mediterranean, he was put on the quarter-deck and made a midshipman. In this capacity he gave splendid proofs both of fortitude and courage. In 1814 he went to Upper Canada, and some time after his arrival he was promoted to the rank of lieutenant, and appointed to the command of a schooner belonging to the British flotilla on the lakes. In 1817, this flotilla having been dismantled, Lieutenant Clapperton returned home on half-pay. He amused himself in his native district with shooting and fishing, until 1820, when he removed to Edinburgh and became acquainted with the late Dr. Oudney, whose mind was absorbed by the subject of African discovery. In 1823 he was employed by Lord Bathurst, in conjunction with Dr. Oudney and the late Major Denham, to make a journey to Timbuctoo, in central Africa. The doctor died at an early stage of the journey in January, 1824. Proceeding south from Tripoli, on the Mediterranean, by Musfeia, and by Zangalia, on the east of the great lake Tchad, Clapperton, after great sufferings, reached Saccatoo, where he was obliged to turn back. He and Denham determined the positions of the kingdoms of Mandara, Bournou, and Houssa, and of their chief towns, but they were not able to ascertain the course and termination of the Niger—the main object of the expedition. From their experience they gave rather a favourable notion of the civilization and hospitality of some of the nations in the interior of Africa, who had been previously set down as ferocious savages. Their description of lake Tchad, with the huge hippopotami in it, and the elephants and other wild animals on its shores, is exceedingly interesting. On the 22d June, 1825, soon after his return to England, Clapperton was raised to the rank of commander, and engaged almost immediately to start afresh on the same perilous journey. His companions were Captain Pearce, R.N., Mr. Dickson, and Dr. Morrison, a navy surgeon and naturalist; the party was attended by Richard Lander, Dawson, and two or three other servants. This time Clapperton penetrated into Africa from the coast of the Atlantic. The party landed in the Bight of Benin on the 28th of November, 1825, and proceeded inland from Badagry, December 7; but they had scarcely moved from the shore when they were attacked by the usual maladies of the country. Dawson died at Tshow, not far from Badagry, and Captain Pearce soon after, at Engwâ. Dr. Morrison, who had returned towards the coast, expired at Jannah. The survivors, meeting with great kindness and hospitality from the natives, reached Katunga, the capital of Yariba, on the 15th of January, 1826. They proceeded to the great commercial city of Kano, and thence, bearing to the west, went to Saccatoo, which Clapperton had reached from the side of the Mediterranean on his former journey. [AFRICA.] Here Bello, the king or chief of the country, detained his old acquaintance on account of wars carrying on, and (it is said) at the jealous suggestions of the Dey of Tripoli, who represented the English as aiming at the possession of all Africa. Clapperton's vigorous constitution gave way under the effects of the climate and privation, and he died of dysentery on the 13th of April, 1827, at Chungary, a village four miles from Saccatoo.

(*Narrative of Travels and Discoveries in Northern and Central Africa in the years* 1822, 1823, 1824, by Major Denham, Commander Clapperton, and the late Dr. Oudney, 4to., Lond., 1826.—*Journal of a Second Expedition into the Interior of Africa*, &c., by the late Commander Clapperton. 4to., Lond. 1829. To this volume a Memoir of his Life is prefixed.—*Records of Captain Clapperton's Last Expedition to Africa*, by Richard Lander, his faithful servant, and only surviving member of the Expedition. 2 vols., small 8vo., Lond. 1830.)

CLARE, a maritime county of the province of Munster, in Ireland: bounded on the north by the county of Galway; on the east and south by the Shannon, which separates it from the counties of Tipperary, Limerick, and Kerry; and on the west by the Atlantic Ocean. The greatest length, from Loop Head on the south-west to the Galway boundary on the north-east, is 67½ miles; greatest breadth, from Black Head on the north-west to Bunratty on the south-east, is 38¼ miles. The area is estimated by Beaufort at 1195 English square miles, or 765,042 statute acres.* Gross population, in 1821, 208,089; do. in 1831, 258,322.

The surface of this county is extremely irregular. The high lands occupy about 150 square miles, included between the Shannon on the east and the Galway boundary on the north. Here the Slieve Baughta mountains attain an elevation of from 2000 to 2500 feet. This group stretches into the adjoining county, and contains three principal connected lakes: Loch Teroig, on the boundary of Clare and Galway; Loch Graney, farther south in the centre of the group; and Loch O'Grady, between Loch Graney and that expansion of the Shannon called Loch Derg in the east, into which the waters of the district discharge themselves by the Scariff river at the village and creek of the same name. Southward from the Slieve Baughta group extends a mountainous tract of less elevation, which runs with little interruption from Scariff on the north to Bunratty on the south, where the waters of Loch Breedy, Loch Doon, Loch Cloonlea, and several other lakes, lying along the western border of the range, discharge themselves by the Ougarnee river into the Shannon. The chief drain of the eastern

* This estimate is uncertain until the completion of the Ordnance Survey of Ireland.

part of this district is the Blackwater, which falls into the Shannon a little above Limerick. West of these groups, and occupying the central district of Clare, there is a comparatively level country stretching north and south, the waters of which, collected from Lochs Inchiquin, Tedane, Inchicronane, Dromore, Ballyally, and several others, unite about the centre of the county and form the Fergus, a fine navigable river, which, augmented by the Clareen at Ennis, the county town, flows due south by Clare, and, after forming a large æstuary with numerous islands and excellent anchorages, unites with the Shannon about eight miles west of Bunratty. The junction of these rivers forms a very noble expanse of water. The remainder of the county, from Loch Buneah in the north to Clanderalaugh in the south, and thence westward to the ocean, is occupied by high lands, the waters from which flow chiefly into the Atlantic by the Dunbeg and Ennistymond rivers. Of these heights the principal is Callan mountain, rising westward from Ennis, over Milltown, a small but flourishing coast town situated about midway on the western line of sea coast. Clare has a much greater extent of coast line than any other county in Ireland. From Scariff, on the Shannon, to Curranrue, on Galway bay, the whole length of coast line is 230 English miles, of which about 140 lie along the Shannon, and 80 on the coast of the Atlantic. This coast, from Black Head on the north to Loop Head on the south, a direct line of nearly 60 English miles, has only two harbours, and these not capable of sheltering vessels of more than 50 to 100 tons. With the exception of the small bays or fishing stations of Kilkea, Dunbeg, Milltown and Liscanor, the whole coast is iron-bound. The Reverend James Kenny, in his statistical account of the union of Kilmanaheen, states that the cliff on which the signal tower of Moher is erected was found by measurement to be 909 feet high, and that the rock somewhat to the eastward proved upon the same measurement to be 1009 feet high. The cliffs average 100 feet in height, and in some places, as at Baltard and Moher, present a face of rock of 500, and even, it is said, of 1000 feet, against which, during a gale, the waves of the Atlantic beat with astonishing fury. Numerous islands and detached stacks of rock mark the devastating effects of these storms, which have disconnected them from the main land. During a storm from the Atlantic the waves have been driven from the bay to the top of the cliff at Kilkea, a height of more than 100 feet, and, rushing down the green fields which back the precipice, have fallen into the little river at the inland foot of the hill. (*Two Months at Kilkea, &c.* Dublin, 1836.)* Where there is a beach, as at Moore Bay and Dunbeg, the swell causes a constant surf. As boats built in the usual manner could not live in such a sea, the people of the coast employ a sort of canoe, formed of tarred canvass spread on a wicker frame, called a *corragh*, similar to the rude vessel used by the antient Britons. In these they frequently go 50 or 100 miles out to sea, and venture with little danger among rocks and shoals where any vessel less pliable would go to pieces. A rent in the canvass is repaired by drying the edges and applying a fresh piece of cloth, spread with hot pitch, to the outside. From the dangerous character of the coast some derive the appellation of Malbay, by which the indentation extending from Dunbeg to Liscanor is known.

The shore of the Shannon, commencing from Loop Head, has numerous creeks, which might be rendered useful either as asylum harbours or stations of trade; but at present there is no security for vessels of heavy tonnage in hard weather nearer to Loop Head than the anchorages of the Fergus. At Carrigaholt, a small village immediately under Loop, is a fishing pier, and at Kilrush, a very prosperous place, about half way between Carrigaholt and the Fergus, is a pier with a quay on a good scale, and every facility for the construction of an excellent harbour; but, until the pier is carried farther forward towards a neighbouring island, so as to screen shipping from the southerly winds, the roadstead cannot be counted secure. 'I will here observe,' says Captain Mudge, in his report (1831-2), 'that this part of the Shanon is exposed to the whole ocean swell; the sea, which sets in such a continuance of southerly or westerly winds, baffles all description, especially when accompanied by the "rollers," a periodical visitation: at such times the swell will break in 12 and 13 fathoms water, or wherever there may happen to be any foul ground.' Eastward from Kilrush the Shannon, which at its entrance is ten English miles in width, begins to contract; but after sweeping in a comparatively narrow and very deep channel round the peninsula of Clanderaulagh, between which and the shore of Limerick is the race of Tarbert, it expands again to a width of several miles at its confluence with the Fergus, about ten miles farther inland. The entrance of the Fergus lies between Innismurry island on the west, and Rinana point on the east. The æstuary is here five miles wide. Towards the western side it is encumbered by islands, of which there are eight considerable ones covering about four square miles. These islands are surrounded with weed and sandbanks, and contract the ship channel to a breadth of about three-quarters of a mile. The channel is safe for vessels drawing sixteen feet of water: and on the mud banks at either side a ship may at all times ground with safety. The tide here seldom runs more than 2½ miles per hour. In the channel there are good anchorages in from three to six fathoms water. The existing dangers and drawbacks are so trifling that a very small expenditure of money would render the Fergus, from its junction with the Shannon to the bridge of Clare, one of the safest and best navigations in Ireland. From the Shannon to Clare the river is called the Lower Fergus, and from Clare to Ennis the Upper Fergus. The Upper is a deep and quiet piece of water, more like a large canal than a river. It is separated from the Lower Fergus by a ledge of rock on which the butments of the bridge of Clare are built. This natural dam keeps the upper part of the river constantly full and navigable to Ennis, the county town, three miles distant. The least water in any part of the Upper Fergus during summer is 13 to 14 feet, and generally 18 to 25, and the average width of the river 150 feet. By connecting the navigations of these two natural canals, Ennis would be brought into an easy and cheap communication with Limerick, and the immense expense hitherto incurred by the farmers of Clare in transporting their goods overland to a market would be most materially reduced. It is affirmed that an outlay of 400*l.* to 500*l.* would give the merchants of Ennis the means of avoiding 12*s.* 6*d.* per ton carriage on grain which they now export from Limerick. So great was the expense of land carriage in this district, in 1830, that coals, burned in Limerick at 22*s.* per ton, cost in Ennis 35*s.*, while all the iron brought overland to this, the assize town of a large county, incurred the enormous charge of 8*d.* per hundred for carriage alone. The subject of the navigation of the Fergus has however been taken up with great spirit by many of the influential resident gentry, and a final report is now in course of being made on this branch as well as on all the other branches of the navigation of the Shannon by commissioners appointed by Government. Eight miles east from Rinana point is the Ougarnee, up which the tide flows to Six-mile Bridge, but the vicinity of Limerick renders its navigable capabilities of little importance. One suburb of Limerick lies in the county of Clare, as well as the chief lines of canal by which the navigation of the Shannon is continued from that city to Killaloe. The whole of the shore of Loch Derg from Killaloe to Scariff might be rendered available for stations of commerce, but the present trade on the Shannon, although latterly much increased, is not yet sufficiently extensive to bring these capabilities into use. It has been proposed to cut a canal from Scariff by Loch Graney through the valleys of the Slieve Baughta mountains and the flat country beyond to the bay of Galway, and also from Poolanisherry bay, near Kilrush, through the flat tract of bog that extends northward to Dunbeg on the Atlantic, so as to give access to the Shannon to vessels embayed in Malbay, without doubling the dangerous promontory of Loop Head; but no attempt has yet been made to carry either scheme into effect.

The roads of this county are perhaps worse than in any other county of Ireland, which is chiefly attributable to the corrupt system under which the grand jury assessments were formerly applied. The evils of this system are now removed by the appointment of a county surveyor, who superintends the application of the public money, and without whose sanction no presentment can be levied. Considerable sums have latterly been advanced by the Com-

* 'Some faint idea may be formed of the force with which the waves of the sea are impelled by western storms, when it is known that cubes of limestone rock, 10 or 12 feet in diameter, are thrown upon ledges of rock several feet high near Doolen; and at the same place may be seen a barrier of water-worn stones, some of them many tons in weight, thrown up above 20 feet high across a small bay, into which fishermen used to land from their boats, and where their former quay, surrounded with huts, remains many yards from the sea: this has occurred within the memory of many living at present.' (Dutton's *Survey of Clare.* Dublin, 1808.)

missioners of Public Works for the construction of roads and bridges in this county; the sums advanced being repaid by instalments presented by the Grand Jury.

The climate is remarkably healthy. Instances of longevity are very frequent. In 1821 there were in the single barony of Bunratty eight individuals, four males and four females, each upwards of 100 years of age. The county is in general much exposed, particularly to violent gales from the Atlantic. Frost and snow seldom continue long. In the sheltered portions of the eastern district, the climate is moist and very mild. Myrtles, both broad and narrow-leafed, have been known to attain a height of upwards of eighteen feet in the open air at Bunratty.

With regard to the geology of Clare, no map exhibiting more than the limits of the limestone district has yet appeared. The Slieve Baughta mountains consist of a nucleus of clay-slate, supporting flanks of sandstone, intruded through a break in the surrounding limestone plain, in the same manner as the Slieve Bloom range on the opposite bank of the Shannon. The limestone, which insulates this mountainous district, spreads westward over the more level basin of the Fergus, and rises into very rugged elevations towards the Galway boundary on the north-west. Beyond the basin of the Fergus commences an extensive clay-slate and trap formation, which stretches westward from the limestone field to the waters of the Atlantic, to which it presents those precipitous escarpments of the coast-line. The whole of this coast abounds in phenomena of the greatest interest, but hitherto they have not been described.

Beds of ironstone and several strata of coal occur upon Mount Callan; a seam of coal, three feet thick, appears in the face of the rock a little above high-water mark over Liscanor Bay, near Ennistymond; and again, near Mutton Island, both inland and on the shore of Malbay; another seam appears in the bed of a river near Carrigaholt, as also at Fieragh Bay, Lemaduff, and Longhill Ferry. Iron ore is found at several places, and in considerable quantities on the Malbay coast, on the banks of the Ardsallas, a feeder of the Fergus flowing from the east, on the shore of Liscanor Bay adjacent to the coal tract, between Corrofin and Ennis in the centre of the county, and in several other places. Rich lead ore abounds in the limestone district, particularly in the mountainous parts of the barony of Birren in the north of the county. Copper pyrites is plentiful in the same barony. Manganese is found at Ennistymond, Carrigaholt, Cross, and other places on the sea-coast. Chalybeate waters abound in the district westward from the sources of the Fergus. Very fine black marble has been raised at Craggliath, near Ennis; it takes a high polish, and is free from spots. On the shore of Loch Graney is found a hard crystalline sand, much used for scythe boards, which are greatly superior to those brought from England. The coast from Kilrush to Carrigaholt abounds with excellent slate and flag quarries. There are also quarries of flag of a good quality at Ennistymond. The Broadford slates from this county have long been celebrated, and are considered nearly equal to the best Welsh; an inferior article is obtained from the slate quarries at Killaloe.

The characters of the different soils correspond to the characteristic geological division. In the schistose and trachyte districts the soil is cold and moory; in the calcareous region warm and friable, though light; on the borders of the different tracts, especially of the slaty and calcareous, deep and loamy. The extent of poor soil is much greater than that of even middling quality; but in some districts there are detached spots of very remarkable richness. These are usually situated along the banks of the large rivers, and are liable to periodical inundations. They are called corcaghs or corcasses, a word nearly synonymous with the English provincial term bottoms. Six tons of prime hay are frequently produced from the Irish acre on these rich levels, and eight tons per acre have been occasionally mowed. The substratum is either a black or a blue alluvial clay, resting on limestone gravel: the black corcass is preferred for tillage, as being drier; the blue for meadow and pasture. They lie chiefly along the Shannon and Fergus from Limerick westward, in some places extending inland to a considerable distance. They are computed at about 20,000 acres in all. One tract of uncommon richness, called Tradree, or the King's Land, is said to have been the private patrimony of the famous Brian Boroimh. The rent of corcasses varies from 3 to 7½ guineas per Irish acre. Another species of rich grazing land of frequent occurrence here as well as in Galway, is the turlogh, or periodical lake, an accumulation of water either forced upward by subterranean channels, or formed by surface-waters which have no outlet. These floods lie in the turlogh during the winter, and leave it prepared for the most abundant vegetation in the spring. In one of these turloghs, 48 Irish acres in extent, near Kilfenora, on the north-western boundary of the limestone district, the proprietor has fattened in one year 42 large oxen and 44 sheep, besides grazing 17 horses and a number of swine; and in the following year has sold off it, in fine condition, 100 two-year old bullocks, and 16 or 17 horses. The whole of this calcareous tract abounds with subterraneous communications through which the water passes from lake to lake, as at the sources of the Fergus, or rises to the surface and forms temporary pools and turloghs. The barony of Burrin, which comprises the north-western portion of the limestone field of Clare, is perhaps the most remarkable district in Ireland. Here the bare limestone rock rises to the surface in all directions, so as to give the whole district the appearance of being covered with a white cement. The country is everywhere very rugged and hilly, and the worst supplied with water of any in Ireland. In an area of twenty English miles by ten, there is but one stream running to the sea, and that has a course of barely eight miles. Another rivulet near it disappears under the crust of limestone after a course of three miles. The only supply of water in the interior is by turloghs. One of these at Kilcorney, a place remote from any river, is fed by a periodical stream issuing each winter from a cave in the vicinity. In the last century this curious cave attracted the attention of Dr. Lucas, who has given an interesting account of it in the 'Philosophical Transactions' for January, 1740, No. 456, p. 360. Notwithstanding its sterile appearance, this county is far from being unproductive. In the crevices of the limestone rock sprouts a very sweet and nutritious grass, particularly well suited for fattening sheep. Yarrow, white clover, trefoil, cinquefoil, virga aurea, juniper, and yew, grow spontaneously and in abundance, although in patches. Some portions of the grazing land set for 3*l.* per Irish acre; and on a few farms store bullocks are fattened for the Limerick and Cork markets. In general however the land is set for very low rents, and by the bulk; and is almost solely devoted to the grazing of sheep, as this stock does not require a copious supply of water like black cattle. The prime sheep-walks here are estimated at above 10,000 acres: some of the rocky pastures are however so poor that it is said four acres will not feed a sheep. The supply of fuel is equally scanty, there being little or no bog; yet from the numerous remains of castles in all parts of the barony, it is evident that it must have been thickly inhabited during its possession by the old Irish. The present inhabitants of the coast procure their supply of turf in boats from the opposite shores of Galway. In all other parts of the county there is abundance of fuel, particularly towards the south-west, where a tract of bog, containing 14,950 Irish, or about 24,000 English acres, extends from the Shannon at Kilrush to the shores of the Atlantic at Moore Bay and Dunbeg. Large quantities of turf are annually exported from the Kilrush side to Limerick. This is the tract through which it was proposed to cut a canal. It is estimated to be reclaimable at an expense of 31,728*l.* There is no limestone in this part of the county, but an inexhaustible supply of sea-sand can be had at Dunbeg. Notwithstanding these inducements to reclaim the portion of this great tract not necessary for purposes of turbary, it still remains an unprofitable waste. The bog of Douragh, eastward from the Fergus, affords the principal supply of turbary to Ennis and Clare. The turf is ricked on the banks of the Upper Fergus, and thence boated to market. Although the county is at present very bare of trees, the bogs abound in timber. A fir-tree measuring 38 to 31 inches in diameter by 68 feet in length was some time since raised from a bog near Kilrush; and it had lost much of its original bulk by decay. The mode of finding bog-timber as practised here is rather remarkable. It is found that the dew does not lie on the part of the bog immediately above a tree, as it does elsewhere. The position of a piece of timber can thus be easily ascertained before the dews rise in the morning; when the finder, after probing with a bog-auger, called in Irish theragher, to ascertain

whether the wood be sound, marks the spot with a spade, and proceeds to raise the timber at his leisure. Fir, oak, and yew, are the chief sorts of bog-wood found.

Agriculture, although rapidly improving, is still in a backward state. Green crops and artificial grasses have been only lately introduced to any considerable extent. The breed of sheep remains in many districts unimproved, from a prejudice against the mutton of the finer-woolled kinds. The general breed of swine is very inferior. The custom of fattening choice heifers for slaughtering has prevented the attention that ought to have been paid to providing superior breeders. The improved breed is however extending; and to meet with stock of the old Irish kind is now unusual. Bulls have been imported by many of the resident gentry from Leicester, Warwickshire, and other grazing districts in England; and the black cattle now sent to market from their prime grazing-lands are of a very improving breed. In the grazing districts along the western coast it is usual to stall the cattle during the greater part of the winter months, as the pasture is completely withered by the violence of the sea-storms that beat on these exposed uplands; but this expedient is very different from any regular system of stall-feeding. The bad state of the roads still renders the employment of asses and panniers not unusual, and in general the small farmers' horses are badly fed and worse appointed.

There is an excellent opening for the establishment of fisheries along the whole of the coast from Kilrush to the bay of Galway. Salmon are taken in great quantities at the mouth of the Shragh or Dunbeg river. The banks of Baltard afford excellent turbot, cod, haddock, ling, dory, mackerel, whiting, and pollock, in great abundance. In the mouth of the Shannon is a regular station for the herring fishery. The oyster-beds of Burrin are celebrated in the Dublin market. Crabs, lobsters, and shrimps are caught in all the creeks; and the cliffs along the whole western coast abound with samphire, dilisk, sloak, and Carrigeen moss. Vast quantities of sea-weed, which forms the best manure for the slaty soil adjacent, are thrown up by every tide on the different beaches and creeks.

There are no manufactures, except of home-made frieze for the use of the peasantry; and the commerce consists chiefly in the export of provisions. Grain and pigs are the articles usually shipped from Carrigaholt, Kilrush, and Clare, which are the only exporting towns in the county.

The exports of the county at large, in the year 1831, as estimated by Captain Mudge, are as follows:—

Wheat	24,000 barrels, or	3000 tons.	
Oats	96,000 „	8000 „	
Barley	10,000 „	2000 „	
Beans	„ „	300 „	

Butter, bacon, and cattle, not known.

Large quantities of grain are sent over land to Limerick; pigs also are driven over land in great numbers.

Imports for 1831.

	Tons.	
Timber	1000	
Iron	500	
Salt	500	
Coals	2500	
Slate	500	
Flags	500	
Bricks	1000	
Whisky	500	
Earthenware	500	(by measurement)
Glass	100	
Sugar	300	
Tobacco	200	
Mercantile goods and sundries	1500	(by measurement)

and about 200 tons per month of turf, brought to market in boats by the Fergus.

There are branches of the provincial and agricultural and commercial banks at Ennis, and a branch of the latter, and of the Limerick national bank, at Kilrush.

Clare is divided into nine baronies: Tullagh and Bunratty on the east; Inchiquin and Islands in the Centre, the latter so called from the islands of the Fergus embraced by it; Burrin, Corermore, Ibrickan, and Moyferta, extending along the western coast from Black Head on the north to Loop on the south, and Clanderlaw east of Moyferta, between it and the barony of Islands. The county contains the entire diocese of Kilfenora, the greater portion of the diocese of Killaloe, and a small portion of the diocese of Limerick. It contains 74 parishes, forming 28 benefices. The only corporate town is Ennis, which formerly returned two members to the Irish, and now returns one member to the imperial parliament. Kilrush is the place of next importance. Corrofin (population 900), Ennistymond (population 1430), Six-mile-bridge (population 1491), and Killaloe (population 1411), are inconsiderable places. The county returns two members to the imperial parliament. The newspapers which circulate in Clare are chiefly printed in Limerick. The number of stamps issued to the Clare Journal for the year ending January, 1836, was 11,484.

The assizes for the county are held twice a year at Ennis, where is a new and good county gaol. There are also bridewells at Ennistymond, Kilrush, Six-mile-bridge, and Tulla. The district lunatic asylum at Limerick comprises this county, which pays a quota of the annual expense proportioned to the number of patients sent from it. For the year 1835 the expense was 1034*l.* 2*s.* 7*d.*, the number of patients being 63. The proportion of the original cost of building the asylum paid by the county was 8955*l.* 8*s.* 1*d.*, the gross cost being 30,200*l.* 17*s.* 2*d.* Of the constabulary and peace-preservation forces, 417 are employed in Clare, at a total expense of 15,987*l.* 9*s.* 4*d.* for the year 1835. Of the expense of maintaining the constabulary department, 5479*l.* 2*s.* 3*d.* is chargeable against the county.

POPULATION.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and commerce.	All other families not comprised in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort	17,396	..	..	..	..	..	..	96,000
1813	Under Pop. Act of 1812	29,301	..	..	..	..	..	..	160,603
1821	Under Act 55 Geo. III., c. 120	36,273	39,212	..	..	..	105,056	103,033	208,089
1831	Under Act 1 Will. IV., c. 19	41,630	43,374	32,580	4537	6527	128,446	129,876	258,322

The civil history of the county of Clare abounds with interest, but we can only glance at the chief events. Originally it formed part of Connaught, but in the year 298, Lugad or Lewy, surnamed Meann, one of the Dal-Cassian successors to the monarchy of Leath Mogh, finally settled the bounds of his kingdom to the limits fixed between Owen More and Conn, about the close of the second century, and thus included it in Munster. The territory corresponding with the present county of Clare, together with the original patrimony of the tribe of Cas, east of the Shannon, was then called Tuaidh Muin or Thomond, that is, North Munster, a name which afterwards distinguished it from Jar Muin, or Ormond, and Des Muin or Desmond, two other divisions of Munster to the east and south. This antient Thomond comprehended the present counties of Clare, Tipperary, and Limerick nearly,* and was ever after accounted the especial patrimony of the tribe of Cas, who are distinguished in Irish history as the Dal-gais, in opposition to the descendants of Oeven, who are known as the Esganacht of Cashel.

Before the year 1168, antient Thomond had been di

* The boundaries of antient Thomond, as determined by the treaty of Dioma, were, from Slighe Dala in Ossory on the east to the Atlantic on the west, and from the isles of Arran on the north to Cashel, Knockaine, and the river Feal on the south.

vided into modern Thomond on the west, and Ormond on the east; and of this latter portion his younger brother Brian, surnamed 'of the Mountain,' was king at the accession of Donnell the Great. Donnell, on his accession, inhumanly put out his brother's eyes, and had himself proclaimed king of all North Munster. He married the daughter of Dermot Mac Murrogh, king of Leinster, the inviter of the adventurers under Strongbow; and being also at war with Roderick O'Connor, king of Connaught, an hereditary enemy, he readily availed himself of the proffered assistance of Robert Fitz-Stephen, when sent as an ally by his father-in-law Dermot. By this means the English gained their first footing in Munster, A.D. 1171. Next year, to secure so effectual an assistance against his great enemy, Donnell did homage to Henry the Second soon after his landing at Waterford, upon which an English garrison was planted in Limerick; but the year after, repenting of his allegiance on some provocation received from his new allies, he assailed the castle of Kilkenny, which he destroyed, and defeated the English of that part of the country in several engagements.

In the year 1543 Morrogh O'Brien, after a fruitless attempt at raising a general rebellion with O'Neill, O'Donnell, and O'Connor, came in and made his allegiance to King Henry the Eighth, renouncing the name of O'Brien, and taking the title of Earl of Thomond, with the style of Baron of Inchiquin for his eldest son. At the same time he surrendered all his possessions to the king, and received them back by an English tenure, as also did O'Neill and Mac William Burke, who were at the same time, and on similar terms, created earls of Tyrone and Clanrickard. By the articles of this submission, the earl agreed to abjure the Irish language, to bring up his people in the practice of husbandry and tillage, and to pay none but legal rents, &c. From him descended in a direct line the family of Inchiquin, several of whom were distinguished leaders in the subsequent wars, particularly Murrogh, the first earl and fifth baron Inchiquin, a celebrated parliamentary and royalist general in the wars from 1641 to the Restoration. Soon after the first earl's submission, Thomond was made shire-ground. An act for the division of Connaught into counties having passed (11 Eliz., c. 9), Sir Henry Sidney (others say Thomas earl of Sussex) plotted out six counties beyond the Shannon, of which Clare was one. Its first division was into eight baronies, different both in names and boundaries from the present. They were laid down in accordance with the possessions of the then principal families, namely, the Macnamaras and O'Gradys on the east, the O'Loughlins on the north, the Mahons and Mac Mahons and O'Deas on the west and south, and the O'Briens of the earl's immediate connexion in the central baronies. One hundred and seventy-two castles are enumerated in this early survey, of which twenty belonged to different gentlemen of the family of O'Loughlin, in the barony of Burrin or Gragans alone. Upon the petition of the second earl of Thomond, 1601, the county of Clare was again made part of the province of Munster, although for convenience sake it continued on the Connaught circuit until the latter end of the last century. The adhesion of Lord Inchiquin, the most influential person in Clare, to the British interest during the wars from 1641 to the Restoration, prevented this part of the county from being the scene of any military operations of importance. Such as did occur were in connexion with the history of Limerick. Pursuant to an ordinance made for the satisfaction of adventurers and soldiers, by the English parliament, in 1653, a district was laid out along the sea-coast of all Connaught, including this county, called the *mile-line*, from its being in breadth nowhere less than four miles from the sea, beyond which in the interior the dispossessed Irish were to be located, and in which, as a barrier between the insulated Irish and the sea, the adventurers and others were to have their portions. This plan of wholesale transplantation was never fully carried into effect. The property of the county cannot be looked on as at all settled until after the Revolution of 1688, when the disposal of the new forfeitures, amounting to 72,246 profitable acres, Irish measure, valued at 12,060*l.* 17*s.* per annum, introduced a new and permanent proprietary. This great tract of country was principally the estate of Daniel Lord Clare, of Carrigaholt, who had raised a regiment of dragoons, and fought in the service of James the Second from the commencement of the war till after the battle of Aughrim. He was grandson of Sir Daniel O'Brien, who had forfeited the same estates in 1641, and had afterwards been restored and created baron of Mogarta and Viscount Clare by Charles the Second in 1662. The other principal forfeiters, in 1688, were Donogh Mac Namara, Donogh and Tiege O'Brien, and Redmond Magrath. The rebellion of 1798 scarcely extended to this county. During the present century Clare was for a time remarkable for agrarian disturbances, now happily at an end. The Clare election of 1828, in which a Roman Catholic was returned to the imperial parliament previous to the removal of the disabilities affecting that part of the population, will form an important epoch in Irish history.

Antiquities.—There are round towers at Scattery Island, off Kilrush (120 feet high, a known landmark in the navigation of the Shannon), at Drumcliff in the barony of Islands, at Dysert (the antient Dysert S'Dea) and Kilnaboy in the barony of Inchiquin, and at Innis Cailtre, an island in the creek of Scariff, on Loch Derg. The abbey of Ennis, which the famous Tenlogh O'Brien enriched in 1306 with bells, crosses, rich embroidery, and painted glass windows (*Annals of Innisfallen and Caitherrim Toirdelbach*), is still standing. The abbey of Quin, in the barony of Bunratty, about five miles east of Ennis, is a noble pile of black marble, for the building of which, in the thirteenth century, Comea More Macnamara, the founder, is said to have been created a prince by the pope. Bishop Pococke describes it as 'the finest and most entire monastery in Ireland.' The ruins on the islands of Innis Scattery and Innis Cailtre are also of great interest to the antiquary. Cromlechs are numerous, and the tomb of Conan on Mount Callan, with its Ogham inscription, is still the subject of inquiry and dispute. There are still standing 118 castles, and raths in all directions. The original documents by which different contracts were made here under the Brehon law are extant, particularly the rentals of Macnamara and O'Brien. Numerous Irish MSS. relating to this county are in existence, still untranslated. There is no portion of Ireland so well calculated to afford materials for a county history; yet the only work hitherto published on the subject is the meagre 'Statistical Survey,' by the agent of the Royal Dublin Society.

The character of the people is like that of the Irish peasantry in other counties, with this unfortunate distinction, that almost all authorities concur in representing the peasantry of Clare as addicted to giving untrue testimony in courts of justice.

Education.—The dioceses in which this county is comprehended stand only 24th and 25th among the 32 dioceses of Ireland. The number of schools in 1820 was 215; in 1821 there were 8159 males and 3794 females under instruction. As the returns of the Commissioners of Public Instruction for 1834 have reference to ecclesiastical divisions, see KILLFENORA and KILLALOE, within which dioceses Clare is comprehended.

The county expenses are levied by grand jury assessments. The annual amount levied averages, on a return of twenty years to 1829, about 28,000*l.* The mode of applotment is liable to many objections, which the Ordnance Survey now in progress is expected to remove. A map of the county, on a scale of one inch and a fourth to an Irish mile, was executed in 1787 by Mr. Henry Pelham: it is not accurate.

(*Statistical Survey of the County of Clare*; *Parochial Survey of Ireland*; Beaufort's *Memoir of a Map of Ireland*; Cox's *History of Ireland*; Vallancey's *Collectanea*; Inglis's *Ireland in 1834*; *Reports of the Record Commission for Ireland*; *Parliamentary Reports and Papers*; *MSS. in British Museum and in Library of Royal Irish Academy*; *Original Communications.*)

CLARE ISLAND, six miles in length, by two and a half in breadth, lies off the coast of the county of Mayo in Ireland. It is situated about midway between Achill island on the north, and barony of Morisk on the south, and in the offing of Clew Bay, which it partially shelters from the swell of the Atlantic. The island rises to the height of 2400 feet towards the west, where its shores are very precipitous. It is included in the parish of Kilgever and barony of Morisk, and in 1821 contained 257 houses and 1395 inhabitants. In 1831 the numbers were—houses, 303; inhabitants, 1616. In 1834 there were on the island two schools in connexion with the Board of National Education,

educating from 80 to 120 young persons. This island has been beautifully modelled, on a scale of four inches to the mile, by Mr. Bald. The model is in the possession of the Royal Dublin Society. (*Reports &c.*, Bald's *Map of Mayo.*)

CLARE, ST., NUNS OF THE ORDER OF, otherwise called Poor Clares. The Nuns of the Order of St. Clare were instituted by that person at Assisi, in Italy, according to Newcourt, about A. D. 1212. This Order was confirmed by Pope Innocent III., and, after him, by Pope Honorius III., A. D. 1223, and was subsequently divided into a stricter and a looser sort. (Newc. *Repert. Ecclesiast.*, vol. i. p. 562.) 'St. Clare,' says Tanner, 'was born in the same town and lived at the same time with St. Francis, and her nuns observing St. Francis's rule, and wearing the same coloured habit with the Franciscan Friars, were often called Minoresses, and their house without Aldgate (London), the Minories.' They were probably called Poor Clares from their scanty endowments. They were brought into England by Blanch, queen of Navarre, who was wife to Edmund earl of Lancaster, Leicester, and Derby, under a licence from King Edward I., A. D. 1293, and were seated in the house already mentioned, without Aldgate. Besides this, there were only three other houses of this order in England, viz., Waterbeche and Denny in Cambridgeshire, and Brusyard in Suffolk. The total of the clear revenues of this order in England, at the suppression of religious houses, amounted to no more than 548*l.* 10*s.* 6*d.* (*Monasticon Anglic.* new edit., vol. vi., p. 1549; Tanner's *Notit. Monast.* Pref. p. 12—56; Dr. Fly's *Account of the Abbey called the Minories, Archæolog.* vol. xv. p. 92—113.)

CLARENCEUX, the name of one of the provincial kings-at-arms in the Heralds' College. It is uncertain when this office was first created. Anstis and Edmondson think it probable that it was by Edward III., but Noble thinks it was by Henry V., who, preferring the herald of his brother Thomas, Duke of Clarence, constable of the army, created him a King of Arms, by the title of Clarenceux, and placed the south part of England under his care. William Horseley was so created by Henry V., and Roger Lygh by Henry VI. Afterwards it sunk into the office of a herald only, but was again revived in the reign of Edward IV. in favour of William Hawkeslow, who had however the west of England only allotted to him as a province. Sir Thomas Holme, knight, who succeeded to the office in 1476, appears to have had first the west, and then the south of England, as the district in which he was to give armorial bearings.

The Arms of Clarenceux are, Argent, St. George's Cross, upon a chief gules a lion of England crowned with an open crown. The Badge is the same, in an escocheon, crowned with a crown of a king of arms, upon a green ground on one side; and on the other, the royal arms crowned upon a white ground, pendent to a gold chain, or simple riband.

(Noble's *History of the College of Arms*, 4to., London, 1804, p. 61 et seq.)

CLARENDON, LORD. [HYDE.]

CLARENDON, THE CONSTITUTIONS OF, were certain declaratory ordinances agreed to at a general council of the nobility and prelates assembled by Henry II. at his palace or manor of Clarendon, in Wiltshire, in the year 1164. These ordinances were sixteen in number, and were intended to define the limits between civil and ecclesiastical jurisdictions, to prevent the further encroachments of the clergy, and to abolish the abuses which had arisen from the gradual and increasing usurpations of the pope. (Howell's *State Trials*, vol. ii., p. 546.)

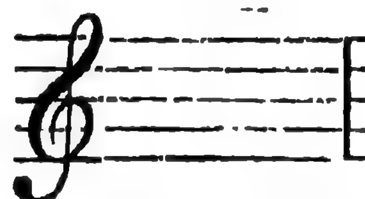
CLARET, a name used in England to denote the red wine of Medoc, or, more correctly, a mixture of that wine and some other description, generally either the wine of Benecarlo, in Spain, or some full-bodied wine, the growth of the southern departments of France, in order to suit the taste of English consumers. The word *clairet*, from which the name is derived, is used in France to signify those wines which are red or rose-coloured, and the name, as understood by us, is not known in that country.

CLARIFICATION, the process of rendering a fluid clear by separating the substances which, being suspended in it, render it turbid. A distinction has been made between filtration and clarification, on the ground that filtration is a mere mechanical operation, while clarification is dependent upon chemical action. In most cases however clarification hardly sustains this character. In clarifying, or, as it is termed, fining, beer, a solution of isinglass or gelatine in stale beer is employed, which carries down the matters that render the beer turbid. Bullocks' blood is used as a clarifier, but more formerly than at present: when mixed with syrup, as the solution of sugar is called, it is coagulated, and carries the impurities along with it; and when they rise to the surface of the fluid they are skimmed off together. White of eggs is also a powerful coagulating clarifier. Sand or clay will in some cases mechanically carry down the impurities of liquors, and render them clear.

CLARINET, a musical instrument made of wood, similar in shape to the oboe, but of rather larger dimensions, and having a fixed mouth-piece containing a reed, which forms the upper joint of the instrument. It was invented at the commencement of the last century by Denner of Nuremberg, though it has not been in general use more than fifty years. The clarinet gives all the sounds of the diatonico-chromatic scale, but the same instrument cannot be used in all the modes, or keys; hence in the orchestra three instruments are employed, of different dimensions, namely, a C, a B, and an A clarinet: that of B is preferred by performers, because more mellow in tone, and more manageable as regards fingering. The compass of the clarinet is from E, the third space in the base, to G in altissimo.



But in the orchestra it is seldom required to go higher than C♯ in alt.



The sounds between the lowest note (E) and B♭, the third treble line, are called *Chalumeau* notes, or notes resembling an antient rustic instrument so named, which was formed of reed.

BASE CLARINET. This was invented, in 1828, by Streitwolf, an instrument-maker of Göttingen. It is made of wood, and played on in the same manner as the common clarinet. Its compass is four octaves, and it descends to B♭ below the base staff. In length it is two feet eight inches.

CONTRA-BASE CLARINET. The same ingenious artist subsequently produced a *double-base* clarinet, which stands in the same relation to wind instruments of wood that the *contra-basso* (double-base) does to stringed instruments, and promises to become very useful in the orchestra. Its form and manner of fingering differ but little from those of the base clarinet: in size it is not larger than the bassoon, and in compass is four notes lower.

CLARION, a kind of trumpet, very shrill, and not now in use.

CLARKE, DR. SAMUEL, was born in October, 1675, at Norwich, where, at the free school, he was distinguished for his progress in classical studies. He entered, in 1691, at Caius College, Cambridge, and applied with great success to the mathematics, under an able tutor, Mr., afterwards Sir John Ellis. The text-book then used in the university was a rugged Latin version of the treatise of Rohault, an implicit follower of the Cartesian theory. Clarke, at the age of 21, after closely studying and justly appreciating the reasonings of Newton's 'Principia,' which had then just appeared, published a more classical version of the text of Rohault, with numerous critical notes, added with the view of bringing the Cartesian system into disrepute by exposing its fallacies. After passing through four editions as the university textbook, it gave place, as Clarke desired, to the adoption of undisguised Newtonian treatises. He now went through a diligent course of biblical reading, in the original languages, in the course of which he carefully studied the early Christian fathers. On his ordination he was introduced to Dr. More, bishop of Norwich, by Whiston, whom he succeeded as domestic chaplain to that bishop for twelve years. In 1699 he published three essays on Confirmation, Baptism, and Repentance, together with Reflections on Toland's 'Amyntor,' concerning the uncanonical Gospels.

Two years afterwards followed his 'Paraphrase of the Four Gospels,' which induced Bishop More to present him with the living of Drayton, near Norwich. In 1704 he was appointed to preach the Boylean lecture at Oxford, when he chose for his subject 'The Being and Attributes of God.' The satisfaction which he gave on this occasion led to his re-election the following year, when he read a series of lectures on the evidences of natural and revealed religion. These discourses were arranged and published as a continuous argument, and passed through several editions with successive improvements. Clarke's mode of demonstrating the existence of God by a process of reasoning from an *à priori axiom*, is precisely that of Spinoza, against whom the argument of Clarke is especially directed. Both take the same point of departure, and agree that, since something does exist, something always has existed. They assert that eternity and immensity, time and space, or duration and extent (for each of these pairs of terms is used without distinction), have always existed, the conception of their non-existence being impossible. It is then considered that, as these are only attributes or qualities, they must necessarily imply a co-existent substance whose attributes they are: a necessary and eternal Being is therefore acknowledged by both, but as to the nature of this Being they differ entirely. Spinoza, like some of the Greek philosophers, concludes this eternal and necessary substance to be the universe itself, material and mental (τὸ πᾶν), which he declares to be the great and only God in whom we live, and move, and have our being. (Compare the passage of Pope's 'Essay,' 'All are but parts of one stupendous whole,' &c.) Clarke asserts that this substance, of which duration and extent are the attributes, is an immaterial and spiritual Being: this metaphysical notion is evidently derived from a passage in a scholium of Newton's 'Principia,' where it is said, 'Durat (Deus) semper et adest ubique; et, existendo semper et ubique, *durationem et spatium constituit*,' &c., a notion very different from that of Bishop Watson, who speaks of God as having no relation to space or time (*Apol.*, p. 135). Spinoza takes no notice of design as evidence of intelligence; and Clarke, in assigning to his personification of eternity and immensity certain moral attributes in accordance with his metaphysical hypothesis, admits that intelligence, in which lies all the difference between the Theists and Atheists, cannot be demonstrated by any reasoning *à priori*, but must depend for proof on the *à posteriori* evidence from observation and induction (prop. 8). According to his premises, he cannot, by logical sequence, avoid landing himself on the same ground with Spinoza. 'It must be owned,' says Sir James Mackintosh (*Dissert. Ency. Brit.*), 'that he is compelled to assume what the laws of reasoning required him to prove,' that is, the existence of a Being extraneous to the constituent parts of the universe. (See *Edinburgh Review*, vol. lii., p. 113, 114). Numerous replies and objections to this *à priori* argument appeared at the time of its first publication. (See a list in Kippis's *Biog. Brit.*, and the correspondence between Butler, afterwards bishop of Durham, and Clarke, printed at the end of Bishop Butler's Works.) One of the principal was 'An Inquiry into the Ideas of Space, Time,' &c., by Bishop Law. The most subtle scholastics, Albert, Aquinas, and Scotus, rejected the *à priori* proof as an obvious *petitio principii*, and many modern writers regard the performance of Clarke as a failure. Pope, who on several occasions says sarcastic things of Clarke, alludes to it in the following passage of the 'Dunciad,' b. iv., l. 455:—

> We nobly take the high priori road,
> And reason downward till we doubt of God.'

The 'Evidences' met with equal opposition. The foundation of morality, according to Clarke, consists in the immutable differences, relations, and eternal fitness of things. The last expression being of frequent occurrence in this discourse acquired a fashionable usage in the ethical vocabularies of the day. Regardless of moral sentiment, so fully developed since by Shaftesbury, Hutcheson, and Adam Smith, Clarke insists solely upon the principle that the criterion of moral rectitude is in the conformity to, or deviation from, the natural and eternal fitness of things: in other words, that an immoral act is an irrational act, that is, an act in violation of the actual ratios of existent things. The endeavour to reduce moral philosophy to mathematical certainty was characteristic of that age, and led to the formation of theories remarkable more for their ingenuity than utility. Dr. Price is an apologist for the moral theory of Clarke, and among its oppugners we may instance Sir James Mackintosh. (*Dissertat. Encyc. Brit.*)

In 1706 Clarke obtained, through Bishop More, the rectory of St. Bennett's in London. He published in the same year an answer to the treatise of Dr. Dodwell 'On the Soul,' in which that divine contends that it is not immortal until made so by baptism. Several rejoinders followed on each side. (See Kippis, *Biog. Brit.*) [COLLINS, ANTHONY.] Clarke at this time published a Latin translation of the treatise 'On Optics,' by his friend Sir Isaac Newton, who in acknowledgment presented him with 500*l.* for his five children. His patron, Dr. More, next procured for him the rectorship of St. James's, and a chaplaincy to Queen Anne, which induced him to take his degree of D.D.; and it is said that no such logical conflict was ever heard in the schools of Cambridge as that which occurred on this occasion between Clarke and Professor James, who, in concluding, exclaimed, 'Profectò me probe exercuisti!' The theses sustained by Clarke were, that 'no scriptural article of Christianity is contrary to reason,' and that 'free agency is indispensably essential to all moral and religious conduct.' In 1712 he published his edition of Cæsar's 'Commentaries,' in folio, with notes, and some fine engravings. The same year appeared his treatise on 'The Scripture Doctrine of the Trinity;' a work which involved him for the remainder of his life in a controversy, in which his principal adversary was Dr. Waterland. The Lower House of Convocation, in 1714, complained to the bishops of the heterodox and dangerous tendency of its Arian tenets, and Clarke was prevailed upon to declare that he was sorry for his offence, and hoped that his future conduct would occasion no further cause of complaint; an act for which he was sternly reproached by his [illegible] courageous friend Whiston. A circumstantial account of this proceeding is given in the 'Apology for Dr. Clarke,' 1714. His favourite subject was the doctrine of philosophical liberty and necessity; on which he began, in 1715, to carry on an amicable controversy with Leibnitz. The papers written on each side were printed, in 1717, in English and French, and dedicated to Queen Caroline, who is said to have carefully examined each MS. previous to publication. In advocating the doctrine of free will, Dr. Clarke had constantly in view the subversion of the writings of Spinoza, which contain, says Dr. Reid, in his 'Essays,' 'the genuine and most tenable system of necessity.' The death of Leibnitz left the controversy undecided, and Clarke soon afterwards resumed his argument in reply to the 'Philosophical Inquiry concerning Liberty,' by the friend of Locke, Anthony Collins. Dugald Stewart, having himself adopted the anti-necessarian doctrine, insists upon Clarke's having gained a great victory over Leibnitz and Collins, and that his arguments on this subject are the most important and powerful of all his metaphysical writings; but many competent judges are of a different opinion.

In 1718 he occasioned a zealous controversy about the primitive doxologies. Dr. Robinson, bishop of London, put forth a pastoral letter, in which he strictly prohibited his clergy from adopting the Arian modifications of Dr. Clarke charging them, as they hoped to obtain God's mercy, to hold them in great abhorrence, as emanating from a strong delusion of pride and self-conceit. Several pamphlets by Whiston and others appeared on this occasion. In 1724 Clarke obtained the mastership of Wigston Hospital, and published a volume of seventeen sermons. On the death of Newton he declined the offer of the mastership of the Mint. At this time he published in the 'Philosophical Transactions' (401) a paper on the velocity and force of bodies in motion. In 1729 appeared his edition of Homer, with Latin version and notes, which is still used in schools. The last nine books were not prepared by Dr. Clarke. He died rather suddenly in May, 1729. His 'Exposition of the Church Catechism,' and ten volumes of sermons, were published after his death. That he retained to the last his Unitarian views, is proved by his emendations of the Liturgy shortly before his death —the MS. of which is in the British Museum—and by the statements of his friend and biographer Bishop Hoadley The moral character of Clarke is admired by all his biographers: his temper was remarkably mild, and his manners modest and unassuming. As a writer he is plain and unaffected; very accurate, but monotonous, tame, and jejune. Voltaire, not without propriety, calls him a *moulin à raisonnement*. He was a wary and very skilful disputant, well disciplined in the scholastic logic. Inferior to

Locke in comprehensiveness and originality, he was greatly superior to him in acquirements, being eminent as a divine, a mathematician, a metaphysician, and a philologist. Dr. Hare, in his 'Difficulties and Discouragements in Studying the Scriptures,' says that Clarke possessed every possible good quality.

(Kippis's *Biog. Brit.*; *Life* by Bishop Hoadley; *Historical Memoirs* by Whiston; *Dissertations* by D. Stewart and Mackintosh, in *Ency. Brit.*)

CLARKE, EDWARD DANIEL, LL.D., &c., was descended from a literary family, and born at Willingdon, in Sussex, on the 5th of June, 1769. He received part of his early education in the grammar-school of Tunbridge, at that time conducted by Dr. Vicesimus Knox. At this early age he showed a fondness for experimental philosophy and physics, but was otherwise an indolent student. In 1786 he went to Jesus College, Cambridge, where, as the orphan of a poor clergyman, he was for some time in very straitened circumstances. Having taken his degree he was engaged by the duke of Dorset, in 1790, as tutor to his nephew, Mr. H. Tufton, with whom, in the course of the following year, he made the tour of Great Britain. Clarke had always been fond of books of travel, and this journey confirmed his passion, and led to his first essay in travel-writing. He published his journal, but without his name, and was very soon ashamed of it. The edition, which was in 2 vols., 8vo., with plates in aquatinta, is now extremely scarce. In 1791 he made a trip to Calais, and seems to have been delighted beyond measure at putting his feet on foreign land. In the course of the following year he engaged as a travelling companion to Lord Berwick, with whom he went through France, Switzerland, and Italy. He returned to England at the end of 1793. In the course of the following year he went again to Italy by the Rhine and the Tyrol, and returning again to England he was chosen fellow-elect of his college, a barren honour without any emolument. For want of a better occupation, he for some time thought seriously of joining the Shropshire militia, in which he was offered a lieutenancy; but in September, 1794, he became tutor in a distinguished Welsh family (that of Sir Thomas Mostyn), with whom he resided some time in Wales, where he made the improving acquaintance of Mr. Pennant. He was afterwards connected in the same manner with the family of Lord Uxbridge, with a member of which he made the tour of Scotland and the Western Isles in 1797. In all these excursions he kept journals, and practised himself in the art of observing scenes and objects, and describing them. About this time he was elected fellow of his college, and being, in addition, appointed bursar, he took up his residence at Cambridge at Easter, 1798. In the spring of the following year he set out with Mr. Cripps, a young man of fortune, on a tour to the countries north of the Baltic. This journey, which was at first intended to occupy only six months, was continued through more than three years and a half, during which master and pupil traversed Denmark, Norway, Sweden, Lapland, Finland, Russia, Tartary, Circassia, Asia Minor, Syria, Palestine, part of Egypt, Greece, Turkey in Europe, and finally returned from Constantinople, across the Balkan mountains, through Germany, France, &c., to England. In consequence of their donations to the University of Cambridge, and other merits, Clarke received the degree of LL.D., and Cripps that of M.A. Among their valuable donations was a fragment of a colossal statue of the Eleusinian Ceres, of the best period of Grecian art. Clarke was also the means of securing for his country the antient sarcophagus, generally but incorrectly called that of Alexander the Great, now in the British Museum. He made considerable collections of medals, minerals, and rare plants: many of the latter he procured from Professor Pallas, in the Crimea. The valuable collection of MSS. which he had made during his travels, he sold to the Bodleian Library, Oxford. In 1807 he began, at Cambridge, a course of lectures on mineralogy, which had become his favourite subject; and at the end of the following year the University established a regular professorship of mineralogy in his favour. Having been ordained in 1805, he received the college living of Harlton, and about four years later he obtained the living of Yeldham from Sir William Rush, whose daughter he had married in 1806. From this time his life was almost entirely passed at Cambridge or in its immediate neighbourhood. In 1810 he published the first volume of his Travels; the second volume appeared in 1812, the third in 1814, the fourth in 1816, and the fifth in 1819. A concluding volume, edited by Robert Walpole, was brought out after his death, making the sixth volume, 4to. His Travels, by which he is chiefly known, are the most popular of his works, and are written in a style which invariably captivates the reader. Full of enthusiasm, and gifted with a prolific imagination, he throws a charm over all that he describes; but unfortunately, his judgment was not sufficiently formed by proper discipline, and neither his observations nor his conclusions can always be relied on. His essays and experiments in physics chiefly appeared in Thomson's 'Annals of Philosophy,' which contain his accounts of the blowpipe, cadmium, &c. In 1803 he published 'Testimonies of different authors respecting the colossal Statue of Ceres;' and in 1805 'a Dissertation on the Sarcophagus in the British Museum.'

He died at Pall Mall, London, on the 9th of March, 1822, and was buried in Jesus College Chapel on the 18th of the same month. (*Life and Remains of Ed. Dan. Clarke*, by the Rev. William Otter, M.A., two volumes, octavo, London, 1825.)

CLARKE, ADAM, LL.D., a highly respected minister among the Wesleyan Methodists, not long ago deceased, the author of various works held in very general esteem, and in several points of view a somewhat remarkable character.

He was born in or about the year 1762. His parents resided in the North of Ireland. They appear to have been persons of respectable character; and his mother especially, who was a native of Scotland, was herself deeply impressed with a sense of the value of high devotional sentiment in union with religious knowledge, and she acted accordingly in the influences which she sought to communicate to her son.

Of education, properly scholastic or systematic, he appears to have received little or none. The effect of this misfortune of his early years is perceived in almost all his writings, as well as in the general tone and character of his mind. The want of it gave a character, and that not a favourable one, to the learning which it is admitted by all that he did by his own unwearied exertions afterwards acquire.

As soon as his mind began to develop its peculiarities, it appeared that Dr. Clarke was extremely eager after knowledge, and possessed within himself resources which would enable him to overcome very formidable obstacles. When he was placed with a linen manufacturer, who lived in the neighbourhood of his father, to learn the trade, he soon found that he was in a situation that afforded no means of gratifying his desire of knowledge. He determined to change the mode of life which had been marked out for him, and he returned to his home. He has related of himself a circumstance which is highly characteristic: that at a very early period of life he took from the Hebrew writers, as his favourite motto, the words, 'Through desire a man having separated himself seeketh and intermeddleth with all wisdom.'

Methodism had been introduced into the part of Ireland in which he resided. His father and mother belonged to that society. There was a Mr. Breedon, one of Mr. Wesley's earliest ministers, who was a friend and the religious instructor of the family, to whom at this period of his life he seems to have owed much.

The union of considerable natural powers with no mean attainments, considering the great disadvantages under which he lay, and of the love of study with a mind eminently devotional, pointed out this young man to the Methodist preachers who frequented his father's house as a person who might be useful in the ministry among the people with whom his family had formed their religious connexion. One of them was so impressed with the persuasion that this was the course of life pointed out for him, that he communicated the circumstance to the great father and director of Methodism. The result was that Clarke removed to England, and was admitted into the school which Wesley had founded at Kingswood near Bristol.

He now found himself in circumstances more favourable for the gratification of his desire to acquire varied knowledge. Not that much was to be learned in such a school as that; but his new situation gave him *time*, which is what a mind disposed as his was chiefly wants. Besides what formed the kind of instruction which was imparted to the students in

this school, he undertook to teach himself other things: and it was while here that he purchased a Hebrew Grammar and began the study of that language, which was the commencement of that course of oriental study in which he afterwards spent much time, and made as is believed, great progress.

The time soon came when he was to leave this school, and enter on the duties of an itinerant or travelling preacher. He was accustomed to relate with pride and pleasure that he received his commission to go forth from the mouth of Mr. Wesley himself. There was a peculiar and touching affectionateness in the old man's benediction. The circuit, as it is called, to which he was appointed was a tract of country near Bradford in Wiltshire.

Thus, in 1782, he became a Methodist preacher, and so continued to the time of his death. In the first twenty years he resided in various parts of the kingdom, but afterwards he lived, for the most part, in or about London, or at an estate which was purchased for him in Lancashire.

In his ministerial character he was singularly acceptable and useful. His preaching attracted crowds. He advanced in influence and reputation in the body of Christians to whom he belonged: and for many of the latter years of his life he was regarded as one of the chief lights and brightest ornaments of that religious community.

If this however had been his only claim to distinction, the name of Dr. Clarke would not have appeared in this work or in the many writings in which, since his death, mention has been made of him. We have already intimated that he was eminently desirous of knowledge of very various kinds, and, while leading the laborious life of a travelling preacher, he found time for a great variety of discursive reading, as well as for much steady application to his philological studies, especially those of Oriental literature. He first gave public evidence of those studies in the year 1802, when he published, in six volumes, his book entitled 'A Bibliographical Dictionary.' This work gave him at once a literary reputation, and it may fairly be said to do him no small honour; not that we mean to represent it as to be placed on a level with the works of De Bure, Panzer, and Brunet, or that it is the result of original researches like the work of our own Ames and Herbert, but it is a most convenient book for the English student, who found nothing like it in the literature of his own country, and it contains a great body of information well arranged concerning books and authors to which no other easy access was presented. The book had, we believe, an extensive circulation.

A Methodist preacher possessed with a taste for the curious researches of which this book was indicative, was a phenomenon that had not before presented itself. It was regarded, we believe justly, as manifesting that a taste for human learning was beginning to prevail in a class of men whose profession might almost be said to be founded on a contempt for such acquisitions, and of whom at least it might be said that they so exalted other objects and other principles that learning merely human was defeated of its just appreciation. We wish that the biographers of Dr. Clarke had informed us how this work was received by his brethren in the ministry, and especially by his elder brethren. He gained however by it a certain reputation among another class of men, the bibliographical and philological inquirers of his time. He began also about this period of his life to be taken notice of for his acquirements in Biblical knowledge and in Oriental literature. On his coming to reside permanently in London, the Bible Society brought him into connexion with some of the dignitaries of the church. His connexion with the Surrey Institution gave him access to several persons of literary pursuits, and at the same time an easy access to books. He was admitted a Fellow of the Society of Antiquaries. The University of St. Andrew's conferred on him the degree of M.A., and afterwards of LL.D. Some time after he became a member of the Royal Irish Academy.

But the most extraordinary circumstance in his literary history remains to be mentioned. The Board of Commissioners on the Public Records selected Dr. Clarke as a proper person to superintend the publication of the new edition of Rymer's 'Fœdera,' with the preparation of which they were charged.

This was a great and difficult undertaking; for it was not the mere reprinting the work of Rymer, but a large mass of new materials were to be found and to be incorporated with the old. Some eminent antiquarian scholars had shrunk from the task. What particularly pointed out Dr. Clarke as a suitable person for this undertaking is not known, as it was evident that his studies had previously lain in a direction very different from that which pointed to such a work as the 'Fœdera,' and he himself acknowledged that he came to the task with very little acquaintance with the nature of it. He however laboured at it with much assiduity for several years. His name appears in the title of both parts of the first volume, and in the first part of the second volume, which was published in 1818, and from that time Dr. Clarke relinquished his share in the undertaking.

From the time when he settled in London he was constantly in communication with the press. Of some works he was only the editor; others he abridged: and he prepared some original works, among which are particularly to be named, 'A Supplement to his Bibliographical Dictionary,' 'Memoirs of the Family of Wesley,' and a work for the assistance of Biblical students. He was also a frequent contributor to the periodical literature of his day. His, as much perhaps as ever any man's, was at this period a life of incessant literary exertion. His health was good.

But there was one great literary undertaking on which, above all, his mind was intent. This was an edition of the 'Holy Scriptures' in the English version, illustrated with a commentary and critical notes, into which he proposed to throw the results of his own Biblical studies, together with much that he might collect from preceding commentaries. It was to form a kind of Family Bible, and yet be at the same time a book which the Biblical scholar might consult with advantage,—a union which has been several times attempted. The first volume appeared in 1810, and excited no small attention on account of the novelty of some opinions expressed in it respecting the tempter of our first parents. From this period he pursued this work as the main business of his life, till he had completed it, which he did in 1826, when appeared the eighth and last volume. For eight of these years, namely from 1815 to 1823, he lived at a place called Millbrook in Lancashire, where some friends had purchased for him a house and small estate.

We have not attempted to give an estimate of the literary value of Dr. Clarke's publications, or even to enumerate them all. We may observe however that they appear to us to have had their full meed of fame. Dr. Clarke, like other extraordinary men who have appeared in situations in which the world did not expect to find them, has perhaps been overrated. It is also of the nature of religious sects to force up into undue elevation persons really meritorious who belong to them. It is quite absurd to place his scholarship on a level with that of the really great scholars who have adorned our country; and it is perhaps one of the most observable circumstances about Dr. Clarke that his mind never seems to have acquired that refinement which scholarship, when it is genuine, never fails to give, or that superiority to vulgar prejudices and to the affectation of display which is, we believe, the usual accompaniment of high attainments. There is in Dr. Clarke a remarkable affectation of bringing forward the Oriental learning he is understood to have possessed. He cannot keep it out of the introduction to the 'Fœdera.' It appears still more strangely in his 'Lives of the Wesley Family,' where he labours after an Arabic etymon of the surname of Wesley, a word really formed according to one of the commonest analogies of our own language. In the same work he gives encouragement to the most vulgar and childish of the popular superstitions. But while we make these remarks, we wish it to be understood that we regard Dr. Clarke as a person on whom it is impossible to look but with respect, and whose life presents an instructive lesson of rewards and honours attending useful labours and consistent virtuous action. We may add also that it shows how the cultivation and encouragement of the devotional spirit may be united with very vigorous exertion in things which have but a slight connexion with it. We must not omit to add two or three circumstances of his later years.

While he resided in Lancashire the two Buddhist priests, whom Sir Alexander Johnston brought from Ceylon for instruction in Christianity, were placed in his family; he was the means of establishing a Methodist mission in the Shetland Islands; and in 1831, a little before his death, he had the satisfaction of establishing schools in the province of Ulster, the part of Ireland in which he was born. He

accumulated a good library, including many manuscripts, and had formed a small museum of natural curiosities.

From 1823, when he left Lancashire, Dr. Clarke resided at Haydon-Hall, in Middlesex, about seventeen miles from London. He died of cholera on the 26th of August, 1832, the only person of much celebrity who was carried off in that time of the nation's visitation.

CLAUDE. Claude Gellée, called Claude Lorraine, was born at Chamagne, in Lorraine, in 1600. His parents were very poor, and it is said that he was originally bound apprentice to a pastrycook. At the age of twelve, being left an orphan, he sought a home at the house of his elder brother, who was in business, as a carver of wood, at Friburg. A relation, who was a travelling dealer, observing some indications of a love for the fine arts, persuaded his brother to allow the lad to accompany him to Rome. Here he was somewhat unceremoniously deserted by his relative, but received pecuniary assistance from his brother. Seeing some paintings by Godfrey Waals which pleased him, he determined to go to Naples, where that painter then resided, to obtain the benefit of his instruction. At the expiration of two years he returned to Rome, attracted by the fame of Agostino Tassi, under whom he studied with unwearied diligence. Having acquired some repute, he made the tour of Italy and France, and part of Germany, staying occasionally for some time at different places to replenish his purse, and paying a visit to his native place. He appears to have frequently suffered through various misadventures, both in health and fortune, during his protracted tour.

On his return to Rome he was received with a general welcome, and a wide and increasing demand for his pictures. Commissions came to him from numerous places, and from many illustrious persons of the principal countries of Europe. He died in 1682.

Claude is an instance of what may be done by a constant and diligent study of nature, and by unwearied manual practice. It was his custom to spend great part of his time, often whole days, from dawn till night, in watching the changes of the effect on earth and sky. He has left proofs of the painstaking labour with which he studied the details of a picture in finished studies of leaves and bits of ground. By these means, although he is said not to have shown any particular quickness in his early progress, he acquired such mastery of hand and eye as produced him fame, wealth, and the rank of the first among landscape-painters. He painted for his study a landscape, compounded of many views, taken in the Villa Madama, with an infinite variety of trees, which he kept as a store of natural objects. He refused to sell it, even when Clement IX. offered to cover it with pieces of gold. This picture, and another of Esther and Ahasuerus, he is said to have mentioned as his best productions. He used to make drawings of his pictures in a book, in order to prevent their being pirated. He left six of these registers, which he called his 'Libri di Verita;' one of them, well known by Earlom's engravings, is in the possession of the Duke of Devonshire.

His colouring is rich, powerful, and brilliant; his tints are varied as in nature itself. His aërial perspective is perfect; the fore-ground stands out with the force and brightness of an Italian sunshine; the distance recedes clear and wide, till the blue hills and blue sky meet in harmonious contrast, or melt into the rich, warm, dewy atmosphere of Rome. His architecture is light and fanciful, and often charmingly mixed with foliage, which is graceful and moving. The water ripples and undulates in the tremulous light, or lies calm and glassy, with deepening shadows. His composition is a singular union of freedom and symmetry. If his landscapes have a fault, it is that the graceful is too invariably selected; a trifle of roughness, or irregularity, would add to the interest of the picture. His figures are very poor, which he freely admitted, saying he sold the landscape and gave away the figures, a trait of modesty which seems in accordance with his mild and amiable character. He left his property to two nephews and a niece, his only surviving relations.

CLAUDE, JEAN, born in 1619, at Sauvetat, near Agen, was the son of a Protestant clergyman, and was himself brought up to the church. He distinguished himself in controversial learning, and was appointed professor of theology in the Protestant college of Nismes, which place he filled for eight years. At the end of this time the vexations of the government authorities obliging him to abandon his chair, he went to Paris, where he was soon after appointed to the church of Charenton in 1666. In this situation he showed himself by his writings one of the ablest champions of the Protestant doctrines, an antagonist not unworthy of Bossuet, Arnauld, Nicole, and other distinguished Catholic divines. In 1671 he published his 'Réponse au Traité de la Perpétuité de la Foi sur l'Eucharistie,' 2 vols., 8vo. [ARNAULD.] In 1673 appeared his 'Défense de la Réformation, ou Réponse aux Préjugés légitimes de Nicole.' In 1681 Claude had a controversial conference with Bossuet, after which he published 'Réponse à la Conférence de Bossuet.' The conference as usual led to no approximation between the contending parties. In 1685 the Revocation of the Edit de Nantes by Louis XIV. obliged Claude to seek refuge in Holland, where he was well received on account both of his talents and his personal character, and the Prince of Orange granted him a pension. He died not long after in 1687, much regretted by his co-religionists as one of their ablest and most estimable advocates. His 'Plaintes des Protestans cruellement opprimés dans le Royaume de France' was published after his death, as well as other posthumous works, chiefly on theological and controversial subjects. He left also some sermons. His style though simple was vigorous, being sustained by great logical skill and much erudition. Devèze wrote a biography of Claude, Amsterdam, 1687. His grandson, Jean Jacques Claude, was one of the earliest pastors of the French Protestant church in Threadneedle Street, London, and died in 1712.

CLAUDE, ST., a town in France, in the department of Jura, on the bank of a small stream called the Bienne, which flows into the Ain, a feeder of the Rhône. It is 240 miles S.E. of Paris in a direct line, in 46° 23′ N. lat., and 5° 32′ E. long.

This town owes its origin to the retirement of the Saints Romain and Lupicin (the latter bishop of Vesontio, or Besançon) to the deserts of Mount Jura, in the fifth century. The sanctity of these holy men, who were brethren, drew around them a number of kindred minds, and three monasteries with other establishments arose in the neighbourhood of their retreat. In the eighth century St. Claude, archbishop of Besançon, came to end his days in one of these monasteries, which afterwards took its name from him, and thus the town acquired its present designation.

The abbey of St. Claude was of the Benedictine order, and the monks were obliged to make proof of noble descent before they could obtain admission into the establishment. The community possessed immense wealth: it is said by La Vallée (*Voyage dans les Départements*)—no very trustworthy authority, indeed—to have had a revenue of 100,000 *écus*, or about 12,500*l.* The monks, before the suppression of the establishment, had ceased to live in common; each had his distinct portion of the revenue. This monastic institution was the last in France which held its vassals in a state of villainage, and whoever was resident a year in their domains became their serf. It was not until the reign of Louis XVI. that the feudal powers of these ecclesiastics were entirely suppressed. The abbot was lord of the town. In 1742 this abbey was secularized, and erected into a bishopric; the bishop and chapter succeeding to the rights and many of the usages of the abbot and monks.

St. Claude is built at the foot of a mountain, one of those amid which it is placed, and at the confluence of the torrent Ison with the Bienne. It is surrounded by walls, which include a part of the adjacent mountain, but cannot be considered as fortified. The town was destroyed by fire in 1799; but a sum of 750,000 francs (about 30,000*l.*) granted by the consular government, and numerous collections made all over France, enabled the inhabitants to rebuild it on a much more regular plan.

The inhabitants amounted, in 1832, to 4170 for the town, or 5222 for the whole commune. They are busily engaged in the manufacture of toys and trinkets in tortoiseshell, horn, ivory, bone, box and other woods: beads, needles, pins, musical snuff-boxes, and other musical instruments, and nails, are among the articles made here. The traders of this town have direct commercial intercourse with foreigners. Several have establishments at Beaucaire; they import goods from Germany and England. There is a good hospital, a large public school, and several other useful institutions. Beautiful marble is quarried in the neighbourhood, and pretty good ochre is procured. Peat for fuel is also obtained.

The arrondissement of St. Claude contained, in 1832,

52,433 inhabitants, who are engaged in making turnery and other wooden wares, spinning cotton yarn, weaving crape, drawing iron wire, making wooden and metal clocks, enamel watch-faces, roasting-jacks, spectacle-frames, and imitation gems.

The bishopric of St. Claude comprehends the department of Jura, containing 312,504 inhabitants. The bishop is a suffragan of the Archbishop of Lyon and Vienne.

CLAUDIA'NUS (CLAU'DIUS) was born at Alexandria, in Egypt, A.C. 365 (*Epist.* i., 20, v. 3). Though of a family originally Roman, his education was Greek; and he appears to have written first in the Greek language. His work on the 'Antiquities of Tarsus' is lost. Of his early life little is known. His first Latin verses were written during the consulship of Probinus, A.C. 395. (*Epist.* iv., vv. 13, 14). In this year he became a dependent of the regent Stilicho, guardian of the two minors, Arcadius and Honorius; and in his poems he sometimes alludes to his soldier's life. (*Prol. Carm. de Consulatu* Mallii Theodori, vv. 5, 6.) Whether from a hope of being immortalized in verse, or from some other motive, Stilicho warmly befriended the poet; nor were the favours of his beautiful wife Serena acknowledged less gratefully than those of the minister himself. (*De Laudibus* Stilichonis, lib. iii.; *Laus Serenæ Reginæ*.) Claudian seems to have enjoyed all the splendour and luxuries which the high station of Stilicho afforded; and he either purchased or requited those indulgences by lavishing indiscriminate eulogies on his patrons and bringing infamy and ridicule on their enemies. The praises of Stilicho are the constant subject on which he delights to dwell, even when he does not directly mention his name; and where the materials of regular history are wanting, his poems form a valuable clue to the connexion and character of events.

The most important favour for which he was indebted to Serena appears to have been her assisting him to obtain a very wealthy bride (*Epist.* ii.). The nuptials were celebrated at Alexandria (*Epist.* ii., vv. 55, &c.); and it seems probable that Claudian and his wife soon after came to Italy. After the war with Gildo he was honoured with a bronze statue (*Præf. in Bellum Geticum*, vv. 5, 6), erected in the forum of Trajan, an honour which, as Gibbon (ch. 30) observes, he acknowledged as a man who deserved it: the inscription which was cut on the statue is still extant (Orelli, *Corpus Inscript.*, vol. i., p. 259).

The death of Stilicho (A. D. 408) was soon followed by the ruin of his favourite. Hadrian, the successor of Stilicho, had formerly been the subject of a satirical epigram (*Epigr.* 25, in some editions 30,) of Claudian, and he now began to watch for a favourable opportunity of revenge. The particulars of his death are not known; but it seems clear that his attempts to conciliate Hadrian were ineffectual, and that he finally fell a victim to his resentment.

It has been a subject of dispute, whether Claudian was or was not a convert to Christianity. The poems which have given rise to the supposition that he was, have been attributed to him erroneously; they are clearly the work of another writer.

Claudian's poetical merits, though not of the highest order, are considerable. He does not excel in the chastised and severe beauties of the older poets whom he aspired to imitate, nor is he remarkable for great invention or a lofty imagination; but in what may be called the picturesque style he is surpassed by none: he brings out the smallest details of a scene into a vivid and correct form, amplified and ornamented with all the graces of diction. The most prosaic topic in his hands is invested with the charms of poetry. An elegant and harmonious versification always delights his reader. 'In the decline of arts and of empire, a native of Egypt, who had received the education of a Greek, assumed in a mature age the familiar use and absolute command of the Latin language, soared above the heads of his feeble contemporaries, and placed himself, after an interval of 300 years, among the poets of antient Rome.' (Gibbon, *Decline and Fall*, chap. 30.)

Claudian's principal poems are, 3 books 'De Raptu Proserpinæ;' 3 books 'De Laudibus Stilichonis;' 2 books 'In Rufinum;' 2 books 'In Eutropium;' 'De Bello Getico;' 'De Bello Gildonico,' &c. The best editions are those of Gesner and Burmann. Claudian is included in Weber's 'Corpus Poetarum Latinorum.' Frankfort, 1833.

CLA'UDIUS NERO, the son of Drusus Nero, the brother of Tiberius, and of Antonia Minor, the daughter of M. Antonius the Triumvir, by Octavia, the sister of Augustus, was born at Lyon B. C. 10. [AUGUSTUS.] In his youth he was sickly, weak, and timid, which made his mother say that he was but the half-finished sketch of a man. Augustus, in compassion, used to call him *misellus*, little wretch. He was left to the company of the women and the freedmen of the palace, and little notice was taken of him under Augustus and Tiberius. He lived in privacy, and appears to have applied himself with perseverance to study. He became a proficient in Greek and Latin, and wrote, with the assistance of Sulpicius Flavius, a history of Rome, in 43 books, which is lost. He suggested the addition of three new letters to the Roman alphabet, and he enforced the use of them during his reign, after which they fell into disuse, but still appeared in the time of Tacitus in the old inscriptions (*Annal.* xi., 14). He also applied himself with much perseverance to the study and practice of oratory, and Tacitus has transmitted to us a favourable specimen in a speech which he delivered before the senate when emperor, in favour of the Gauls, who were asking to be admitted to the rights of Roman citizens. (*Annal.* xi., 24.)

When Caligula, who was the nephew of Claudius, became emperor, he took his uncle as his colleague in the consulship, A. D. 37. After the expiration of his consulship Claudius again withdrew into privacy, from which he was dragged by some mutinous soldiers, who were overrunning the imperial palace after the death of Caligula, and who discovered Claudius concealed behind a tapestry, and trembling from fear. They raised him on their shoulders, and carried him to the camp, where he was proclaimed emperor by the troops, A. D. 41, against the wishes of the senate and of many of the citizens, who were for restoring the republic.

This was the first example of that baneful practice, which the soldiers so often repeated, of disposing of the imperial crown. Claudius, who was then 50 years of age, began his reign by acts of justice and of mercy; he recalled exiles, restored to the rightful owners much property which had been confiscated under Tiberius and Caligula, rejected the honours and titles which the flattery of courtiers would have bestowed upon him, embellished Rome, formed an aqueduct for a fresh supply of water, which still bears his name, constructed a harbour at the mouth of the Tiber, and began the emissary of the lake Fucinus. [CELANO.]

He also went over to Britain, which country he first permanently occupied, at least in part, by his generals Plautius and Vespasianus, and afterwards by Ostorius. [BRITANNIA.] Caractacus, who was brought prisoner before him at Rome, experienced the imperial clemency. Claudius afterwards fell into a state of apathy and imbecility, being entirely governed by his profligate wife Messalina and the freedmen of the palace who were leagued with her. They took advantage of his excessive timidity and credulity to make him sign the death-warrants of numerous senators and knights, whom they represented as conspirators, and whose property was confiscated for their benefit. Messalina openly abandoned herself to the most shameless licentiousness, and no one dared to check her, or remonstrate with the emperor on her conduct, for fear of incurring her deadly revenge. She carried her effrontery at last so far as publicly to marry Caius Silius, one of the handsomest men of Rome, while Claudius was absent at Ostia. The emperor, who was roused from his torpor by the report of this scandal, gave orders that Messalina should be put to death. Soon afterwards he married, A.D. 50, his own niece, Agrippina the younger, the widow of Domitius Aenobarbus, and mother of L. Domitius. Agrippina easily prevailed on the weak Claudius to adopt her son Domitius, who assumed his stepfather's name of Nero, by which he was afterwards known as emperor, and to give him in marriage his daughter Octavia. Agrippina having thus paved the way for the succession of her own son to the throne, to the prejudice of Britannicus, the son of Claudius by Messalina, completed her object by poisoning her husband at Sinuessa, where he had gone for the benefit of his health. Claudius died A. D. 54, in his sixty-fourth year, after being in possession of the sovereign power for thirteen years and nine months. His funeral was celebrated with great pomp, and he was numbered among the gods, but his will was not read in public, in order to avoid exciting disturbances among the people on account of the preference given to Nero over Britan-

nicus. (Tacitus, *Ann.* xii. 69; Suetonius, *Claudius*; Dion.)



[Coin of Claudius Nero.]

British Museum. Actual size Bronze. 437 grains.

CLAU'DIUS, or CLODIUS, ALBI'NUS, a native of Adrumetum, in Africa, served with distinction under Marcus Aurelius and Commodus in various parts of the empire; in Asia, in Gaul, in Germany against the Frisians, and lastly in Britain. When Avidius Cassius, governor of Syria, revolted against M. Aurelius, Albinus, who commanded the troops in Bithynia, checked the revolt which was beginning to spread among his soldiers. In consequence of this service he was raised to the consulate, together with Pompeianus, the emperor's son-in-law, A.D. 176. When Septimius Severus became suspected of aspiring to the empire, Commodus, with the view of strengthening himself, offered to Albinus, who was then commanding in Britain, where he had succeeded Pertinax, the title of Cæsar, which Albinus declined. After the assassination of Commodus and of his short-lived successor Pertinax, Didius Julianus being made emperor by the prætorian guards of Rome, who now assumed the right of disposing of the empire to the highest bidder, three commanders of the legions abroad, Albinus in Britain, Severus in Illyricum, and Pescennius Niger in Syria, stood forth to dispute this right by the corresponding argument of the will of their own soldiers. Severus, who was the nearest to Rome, marched upon the city, upon which the senate proclaimed him emperor, and the prætorians made way for him by assassinating the unfortunate Julianus. Severus while on his march had written to Albinus, proclaiming him Cæsar, and adopting him as his successor. This time Albinus accepted the title, which he assumed publicly at the head of his legions; and the senate confirmed it, after the accession of Severus. But the new emperor having first overthrown his competitor Pescennius Niger, resolved to rid himself also of his dubious associate Albinus; who, having discovered his intentions in time, passed over into Gaul, where he was proclaimed emperor, and strengthened himself by fresh recruits. Severus hurried from the east against this new enemy, and after several partial engagements a great battle was fought near Lyon, in February, A.D. 197, in which Severus was worsted at first and wounded, according to Spartianus, but succeeded in rallying his cavalry, with which he gained the victory. The soldiers of Albinus having taken refuge within Lyon, that city was invested, stormed, and burnt, by the troops of Severus. Albinus, according to Dion, killed himself, and his body was carried to Severus, who had the head cut off and taken to Rome, and the body thrown into the Rhone. Severus, with his characteristic inhumanity, put to death the wife and children of Albinus, and ordered a general proscription of all his friends, who were numerous in Gaul and in Spain, and even at Rome. Albinus appears to have been a man of considerable talents and information. He was a distinguished commander, and had many partisans among the senators, but was harsh and even cruel in his military discipline: and is said by Capitolinus to have been an enormous glutton. (Herodian, Dion, and Spartianus; and Julius Capitolinus in the *Historia Augusta*.)



[Coin of Claudius Albinus.]

British Museum, Actual size. Bronze. 337 grains.

CLAUDIUS, MARCUS AURELIUS, surnamed GOTHICUS, was born in Illyricum A.D. 214, served in the army as tribune under Decius, was afterwards governor of his native province under Valerianus, and after the death of Gallienus in 268, near Milan, was proclaimed emperor by the army. The choice was immediately approved by the Senate. Claudius began his reign by defeating the usurper Aureolus, who had revolted against Gallienus, and had taken possession of Milan. Aureolus was killed in the battle. Claudius afterwards marched against the Germans, who had entered Italy, and defeated them on the banks of the Benacus (Lake of Garda.) On arriving at Rome, he was received with great honours, and applied himself to reform many of the abuses which existed in the administration of the empire. In the following year he marched against the Goths, or Scythians, who had invaded the provinces of Mœsia, defeated them with great slaughter, and made a vast number of prisoners, whom he distributed over various provinces as labourers. In consequence of this victory, he assumed the name of Gothicus. In the year after (A.D. 270) he died at Sirmium, in Pannonia, of a contagious disease which had spread in his army, after a short reign of little more than two years, during which he exhibited virtues and abilities that entitle him to be numbered among the best emperors of Rome. The Senate named his brother Quintilius his successor, but the army proclaimed Aurelianus, upon which Quintilius was killed, or killed himself according to others. (Trebellius Pollio *in Historia Augusta.*)



[Coin of Claudius Gothicus.]

British Museum. Actual size. Bronze. 125 grains.

CLAUSENBURG (Kolos), a county in the west of Transylvania, in that part of it called the 'land of the Magyars,' which is one of the four divisions of the principality. It has an area of 1861 square miles, and contains 100,000 inhabitants, who are chiefly employed in rearing cattle, in agriculture, mining, and a few manufactures, and trade. It has one royal free town, five market-towns, 202 villages, and thirty-five prædia, or privileged settlements, and is divided into six 'processes.' The chief rivers are the Szamós and Körös. It is very mountainous: the most elevated points are Varatik, Trugassa, Yladiassa, Balamirassa, and Kalota. It abounds in horses, oxen, sheep, goats, and swine; also in honey and corn, and produces salt, gold, iron, and some wood.

CLAUSENBURG (Klush, Kolosvár), a royal free town and capital of the principality of Transylvania. The town was founded by the Romans, who gave it the name of Claudia, whence its Latin designation Claudiopolis. In 1178 the new town was enlarged by a colony of Saxons, who from its locality called it Clausenburg, from the old word Klause, which signifies a mountain defile. The citadel, which lies on a hill, was not erected till 1721, since which date commodious barracks have been made in it. Owing to its flourishing trade and manufactures it was formerly one of the principal towns of the country. Settlers flocked to it from all parts, till the place becoming too confined, the new-comers were obliged to take up their abode in the neighbouring villages, which thus became the property of the town. Clausenburg is situated on the river Szamos, in the midst of a romantic valley, surrounded with mountains, and studded with fields, gardens, and vineyards. It is surrounded with lofty walls and towers, and is divided into the inner town and six suburbs; the former consists of the Ovar (Altburg), or old town, and Ujvas, or new town, and though of small extent has a very pleasing appearance. It has some handsome streets and houses, and a large market-

place, 500 paces long and 360 broad. There are also several churches, the most striking of which is the Roman Catholic cathedral, erected in pursuance of a vow of King Sigismund in 1399; it is 94 paces long and 34 broad, and contains some fine monuments. Of the other churches, five are Roman Catholic, several Protestant, and one Græco-Catholic. The members of the Oriental Confession have their distinct places of worship.

Clausenburg contains an academical lyceum, having 185 students, with a public library attached; a Roman Catholic gymnasium, with 270 pupils; a reformed college, with 550 pupils; a Græco-Catholic, with 306 pupils; a Roman Catholic seminary; a seminary for the young nobility; a Franciscan convent; normal schools, with above 300 scholars; a house of industry for poor men and women, established by an association of ladies; an orphan asylum, two hospitals, and various other charitable institutions; a Casino, containing the assembly rooms, the profits of which are devoted to purposes of charity; a large national theatre, and several public gardens around the town, one of which is called the 'People's Gardens.' Among the other buildings is the old castle, which is now in ruins, the town-hall in the market-place, and numerous palaces belonging to the higher nobility.

Clausenburg is the seat of the government of Transylvania, of the consistory of the Protestant and Græco-Catholic communions, the board of education, and other public departments. Being a Fiskal-gut or Taxal-Ort (that is, a place having its own independent jurisdiction), it is not included in the jurisdiction of the province, but all its civil and other affairs are conducted by its own judges and magistrates. It contains 20,000 inhabitants, who are chiefly Hungarians, intermixed with Saxons, Armenians, Greeks, and Jews. There are few mechanics, and it has little trade. The manufactures, which are inconsiderable, are chiefly woollens, earthenware, and paper. It is the birth-place of the celebrated Matthias Corvinus, king of Hungary. 46° 53′ N. lat., 23° 48′ E. long.

CLAUSI'LIA. [LIMACINEA.]

CLAUSTHAL, in the Hanoverian Landrostei, or Bailiwick of the Harz, the largest and most important of the mining towns of the Harz, is an open place built upon two naked eminences, and separated from Zellerfeld (a town of 4000 souls) by the rivulet called Zellerbach. It is the seat of administration for the mining districts of Hanover, and lies at an elevation of 1170 feet above the sea, and about 50 miles S.E. of Hanover. The adjacent parts abound in ores. The streets are straight and broad, and planted in general with chestnuts and lime-trees, but are very badly paved. It contains two churches, an orphan asylum, a mint, in which about 700 ducats and 400,000 dollars are annually coined, and public offices, a mining academy, to which a seminary for teaching forest economy is attached, with collections in mineralogy, &c., a gymnasium, manufactories of iron ware, yarns, woollens, camlets, &c., and several elementary schools. In the immediate vicinity are the richest mines of the Upper Harz: their chief products are annually about 160,000 ounces of silver, 4 tons of copper, and 2400 tons of lead and litharge: they employ upwards of 2000 workmen. The number of houses in Clausthal is about 850, and of inhabitants about 8900. 51° 48′ N. lat., 10° 20′ E. long.

CLAVAGELLA (Zoology), a genus of testaceous acephalous animals established by Lamarck in the fifth volume of the 'Histoire Naturelle des Animaux sans Vertèbres,' published in 1818, and arranged by him under his Tubicolées, between *Aspergillum* and *Fistulana*. He described four species, all fossil, referring at the same time to the 'Annales du Muséum,' where he had figured the first of them under the name of *Fistulana echinata*. Lamarck thus defines the genus:—'A tubular, shelly sheath, attenuated and open anteriorly, terminated posteriorly in an ovate subcompressed club beset with tubular spines; the club presenting on one side the one valve fixed in its wall or substance, while the other valve remains free in the tube.'

The genus was only known in a fossil state to conchologists, when Mr. George Sowerby, to whom students in this department of zoology are much indebted, observed in the British Museum a recent specimen, which he at first thought might be an *Aspergillum*, inclosed in a mass of stone. On application to Mr. Children, that gentleman allowed Mr. Sowerby to examine it more closely, and on scraping away some of the investing stone, the latter found *Clavagella aperta*, the first recorded recent species, and figured and described it in his 'Genera of Recent and Fossil Shells.' The same naturalist, on the return of Mr. Samuel Stutchbury from his voyage to some of the Australian and Polynesian Islands, described and figured (1827) a second species, *Clavagella Australis*, three specimens of which were with difficulty obtained by Mr. Stutchbury at North Harbour, Port Jackson, in a siliceous grit like that of the coal-measures, where their presence was betrayed just beneath low-water mark, by their forcible ejection of the water from the aperture of their tubes: the specimen of *Clavagella Australis* figured by Mr. Sowerby is also in the British Museum. In 1829 Mr. Henry Stutchbury, in arranging the collection of Mr. Isaac Lyon Goldsmid, suspected the presence of a *Clavagella* in a mass of *Astræopora*, and, on fracturing the specimen, laid open two individuals of another species (*Clavagella elongata*, Brod.). According to Cuvier, and a notice in the 'Annales des Sciences Naturelles' (tome xvii., p. 78), M. Audouin (1829) described a recent species, and M. Rang, in his 'Manuel des Mollusques' (1829), mentions another, apparently *Clavagella rapa*.

Still the animal remained unknown; when, on the return of Mr. Cuming from his first voyage, that zealous collector produced another specimen which fortunately included the soft parts. A fragment of calcareous grit was dredged up by Mr. Cuming from a depth of eleven fathoms, at the island of Muerte, in the bay of Guayaquil, and in this was the greater portion of the chamber and tube, both valves, and the animal of *Clavagella lata*, Brod. Mr. Broderip, who has described this and two other recent species in the first volume of the 'Transactions of the Zoological Society' (p. 261), says, that a close examination of the recent species has convinced him that though one valve is always fixed or imbedded in the chamber, and soldered, as it were, to the tube, so as to make one surface with it, the tube is not necessarily continued into a complete testaceous clavate shape. In Mr. Goldsmid's best and largest specimen, the fixed valve was imbedded in the coral, and though continued on to the tube or siphonic sheath, was surrounded by the wall of the coral chamber at its anterior extremity. In the other specimen the fixed valve was also continued on to the tube. In the first-mentioned specimen of *Clavagella elongata*, at the anterior or greater end of the ovate chamber, an insulated or shelly plate had been secreted with tubular perforations; that part of the chamber having afforded (apparently at a former period) the best communication with the ambient fluid: but a calcareous deposit having almost entirely cut off that communication, the animal seemed to have been compelled to secrete a second shelly plate towards the anterior ventral edge of the fixed valve, where the perforation of some other shell (a *Lithodomus* probably) secured the necessary influx of water. Nor is this the only instance of the secretion of a second tubular plate which has fallen under Mr. Broderip's notice. In the last-mentioned, or smaller specimen, the perforated shelly plate joins the anterior ventral edge of the fixed valve laterally, that point of the chamber being evidently the most practicable for communicating with the water by means of the tubules: the rest of the anterior edge of the fixed valve is surrounded by the coral wall. In Mr. Cuming's specimen the fixed valve is continued on to the tube. The anterior edge of this valve is surrounded by the naked wall of the chamber, and the greater end of the chamber, or that part of it which is opposite to this anterior edge, being impracticable, from its thickness, as a water communication (with a small exception, which, not improbably, had ceased to be available), the animal had been driven to secrete the perforated shelly plates not far from the throat of the tube on either side, where the chambers of *Petricolæ* or *Lithodomi* opened a passage to the surrounding water.

Organization.

Position, &c. of the animal.—Mr. Owen made his observations in his excellent paper on the anatomy of *Clavagella* (*Zool. Trans.*, vol. i. p. 269) from the specimen of *Clavagella lata* above alluded to, the soft parts of which were placed in spirit by Mr. Cuming soon after its capture. He found the following to be the relative position of the animal:—The *mouth* turned towards the closed end of the chamber, which is consequently the anterior part. The *heart* and *rectum* near the side where the valves are con-

nected by the ligament, or the dorsal part. The visceral mass projecting towards the opposite or neutral side. The *siphon* extending into the commencement of the calcareous tube, which leads out of the anal or posterior part of the chamber. The *fixed valve*, which covers the rough surface of the porous rock or coral, like the tiling of a chamber-floor, and affords a smooth polished surface for the support and attachment of the animal, is the *left valve:* the *right valve* remains free, or is connected only to the soft parts and cardinal ligament, in order to assist in the excavating and respiratory actions.

Shell.—The shelly substance of the fixed valve passes without interruption into that of the tube; a slight ridge circumscribing the entry of the tube into the chamber indicating the line of separation, unless the extent of the valve be limited to that of the internal nacreous deposition. The *tube* of an oval form, 7 lines by 5 in diameter. The calcareous walls $\frac{1}{30}$th of an inch in thickness at the outlet, and about $\frac{1}{30}$th at the opposite extremity. The *free valve* unequally triangular, with the angles rounded off, about the thickness of a sixpence, moderately concave towards the soft parts, and striated only in the direction of the layers of increment on the outer surface, as in most of the *Pyloridean* Bivalves of M. de Blainville. The layers gradually increase towards the dorsal edge for a little more than one half of the valve, beyond which the layers continue of almost equal breadth. 'This growth of the valve,' adds Mr. Owen, 'corresponds to the direction in which the chamber is enlarged, which is principally on the dorsal, dextral, and anterior sides: now this is the mode of enlargement best adapted for the full development of the ovary; so that it would seem that the *Clavagella* continues for a time to work its way into the rock without material increase of size, leaving behind it a calcareous tube, which marks its track; after which it becomes stationary, and limits its operations to enlarging its chamber to the extent necessary for the accomplishment of the great object of its existence.'

Mantle, and Muscular System as ancillary principally to Respiration.—Mantle enveloping the body like a shut sac, but perforated for the siphon and foot, the opening for the latter being reduced to a small slit. M. Rüppell observed an analogous orifice in the corresponding part in *Aspergillum*, viz. that which is next the sunken sieve-like extremity of the tube, and by which he supposes the water necessary for respiration to be received when the retreating tide leaves exposed the expanded siphonic extremity. Mr. Owen is of opinion that this cannot be its use in those species of *Clavagella* which exist at depths too great to allow of their being ever left with the siphonic aperture out of water; but that it must serve to keep up a communication with the neighbouring cavities of the rock, by means of the calcareous tubules, the formation of which is determined by the proximity of these cavities. When therefore the *Clavagella*, by a sudden contraction of its adductor muscles, has forcibly expelled the branchial currents from the siphon, as was observed by Mr. Stutchbury, the space between the free valve and the walls of the chamber would be simultaneously filled, either by water rushing in through the tubules, or forced out from the branchial cavity through the small anterior orifice of the mantle. To assist this operation there is a proportional development of the muscular system, which is remarkably powerful. The impression of the great or posterior adductor is carried two lines beneath the surface of the chamber posteriorly, but gradually rises to the level of the valve. The impression of the smaller anterior adductor is more faint, and is continued into the sinuous pallial impression, which follows the contour of the anterior margin of the valve at about two lines distance from it. In the free valve the last two muscular impressions are separate. The outer dermoid layer of the mantle is extremely thin, and, where it does not line the valves, is mottled with minute dark spots, less numerous than those on the skin of *Cephalopods*, and presenting, under the microscope, a glandular appearance. The muscular layer, after forming the *siphon* and its retractors, is confined to the anterior part of the mantle, where it swells into a thick convex mass of interlaced and chiefly transverse fibres, and forming, Mr. Owen supposes, one of the principal instruments in the work of excavation. No fibres could be detected in other parts of the mantle; nor, observes Mr. Owen, could any be expected in a mantle which had no lobes to be retracted. The *siphon*, in the contracted state, formed a slightly-compressed cylindrical tube, half an inch in length, and the same in the long diameter, traversed longitudinally by the branchial and anal canals, separated from each other by a muscular septum, extending to the end of the siphon, beyond which the two tubes do not separately extend outwards, agreeing in this respect with *Gastrochæna* and *Aspergillum*. Muscular walls of the siphon two lines in thickness; the septum separating the branchial and anal canals one line; diameter of each canal about one line; inner extremity both of the anal and respiratory tube provided with a valvular fold: terminations beset with short *papillæ*. The retractor muscles attach the siphon to the posterior adductor on one side, and to the anterior extremity of the oval mass of muscular fibres above mentioned on the other, leaving an intermediate space on both sides the body, which exposes part of the gills and labial tentacles. The muscular mass which bounds the anterior part of the animal's body is oval, one inch three lines long, eight lines broad, and varying in thickness from two to three lines: it is smooth and convex externally, and hollowed out within to lodge the *viscera* at the base of the foot, for the passage of which it leaves the small orifice above mentioned. The margins attached to the valves are more or less irregular; that affixed to the loose valve is the broadest, being at the ventral extremity three lines in length. Mr. Owen thinks that it may here be regarded as a third adductor: posteriorly it is continued into the small adductor muscle.

Branchiæ and Circulating System.—The gills have the same laminated structure as that observed in other bivalves they are broad and short, corresponding to the form of the animal, and the *laminæ*, not thin compressed layers, but broad and projecting but little from the sides of the visceral mass, are arranged in three layers instead of two, on either side of the foot. They take their origin between the labial appendages, at the side of the mouth, extending backwards towards the inner orifice of the respiratory tube, where they meet, join, and terminate in a point which is unattached for about one-eighteenth part of the entire gill. The branchial veins are continued from the concave side of the gills, a few lines behind their anterior extremities: these veins are joined by others from the muscular part of the mantle, and then terminate in two large membranous dark-coloured auricles. These communicate with a fusiform ventricle, single externally, but divided within, by a longitudinal *septum*, into two compartments, corresponding to the auricles; which compartments communicate together at the *apex* of the ventricle, from which the principal artery is continued. (Owen.)

Digestive System, accordant with the structure of the same part in the other acephalous mollusks. The mouth, a transverse slit, without masticatory or salivary organs, is bounded by the upper and lower labial processes which are continued in the form of two transversely striated pointed tentacles on either side: these prehensile, sensitive, and, according to Mr. Owen, probably respiratory organs measure, each, six lines in length, and about one and a half line in breadth. The œsophagus, after a course of two lines, dilates into a stomach, the sides of which are perforated by the large hepatic ducts. The intestine, after a course of eight lines, forms a small cæcum about one line in length: this, Mr. Owen observes, may be taken for a *pancreas;* or perhaps is the analogue of the blind sac containing the peculiar amber-coloured style which projects into the pyloric end of the stomach of some *Bivalves*. The little *cæcum*, in the specimen dissected, contained the same brown granular material as distended the rest of the canal. The intestine, after making three close turns upon itself in the mass of *ova* and hepatic follicles at the base of the foot, passes in immediate contact with, but not through, the heart, and then below the posterior adductor, to opposite the posterior office of the anal tube. The exterior of the intestine has an irregular honey-combed appearance, from the close adhesion to it of the capsules of the *ova*. The *liver* has the same divided follicular structure and green colour as in the other *Bivalves*. (Owen.)

Nervous System.—A large and conspicuous *ganglion* is situated at the posterior part of the base of the foot, just above the orifice of the anal tube. Two nervous cords extend from this *ganglion*, on either side the foot to the mouth other branches radiate in the opposite direction to the siphonic and adductor muscles. (Owen.)

Generative System.—The ovary, of a grey colour, forms a mass at the dorsal aspect of the body above the great ad-

ductor muscle, and extending ventrad on either side the *œsophagus* and stomach to the opposite end of the base of the foot. All this mass of intestinal folds, hepatic follicles, and *ova* was covered by a thin membrane. The little muscular process or foot which passes through the anterior slit of the mantle is but four lines long, and half a line in breadth: its possible use may be to apply a solvent to the rock in which the chamber is excavated. (Owen.)

Habits.—Mr. Broderip observes that we are left to conjecture the causes which operate to determine the animal in the choice of its abode, if indeed it can be called choice, for most probably *Clavagella* is the creature of circumstances, and if, soon after its exclusion from the parent (when Mr. Broderip supposes it to be furnished with its two valves only, and to float free, with, perhaps, some voluntary impulse), it arrives at the vacant hole of some small *Petricola*, *Lithodomus*, or other perforating *Testacean* which suits it, one valve soon becomes attached to the wall of the hole, and then the animal proceeds to secrete the siphonic sheath or tube, to enlarge the chamber according to its necessities, and to form the shelly, perforated, tubular plate which is to give admission to the water at the practicable part of the chamber. How the excavation is carried on is also doubtful. The chambers of the individuals of *Clavagella Australis*, described by Mr. Broderip, were formed in a siliceous grit, those of *Clav. elongata* in an *Astræopora*, that of *Clav. lata* in a calcareous grit, and those of *Clav. Melitensis* in an argillo-calcareous tufa. 'If,' says the author last mentioned, 'the excavation be the work of a solvent secretion, it must be a solvent of extensive power. The situation of the glands, detected by my friend Mr. Owen, leads me to think that they minister in some way to this operation; and I do not see how the anterior or greater end of the chamber can be operated on by mere mechanical attrition with such parts as must have been contiguous to it. It has been objected that any solvent which would act on a calcareous rock would equally act on the calcareous shell of the animal; but there is, perhaps, more of point than of strength in this objection. Without laying too much stress on that law of nature by which chemical and vital forces are placed in a state of hostility,* and which may or may not be applicable to such a substance as shell, the gland for the secretion of the supposed solvent, as well as the organ for applying it, may be so placed as that the solvent shall only come in contact with the inorganic or dead substance to be acted on without touching the shell. Again, it has been asked, what solvent would act equally on a calcareous and on a siliceous substance? To this it may be answered, first, that it is not pretended that the nature of the supposed solvent is known; secondly, that, in siliceous grits, there is more or less calcareous matter by which the mass is held together, and that the solution of the calcareous particles would be followed by the disintegration of the stone. * * * *. One observation, arising from the various depths at which the recent species have been found, will not, perhaps, be deemed irrelevant. *Clav. Australis* was so near the surface at low water, that it was detected by its ejection of the fluid; *Clav. elongata*, from the nature of the coral in which

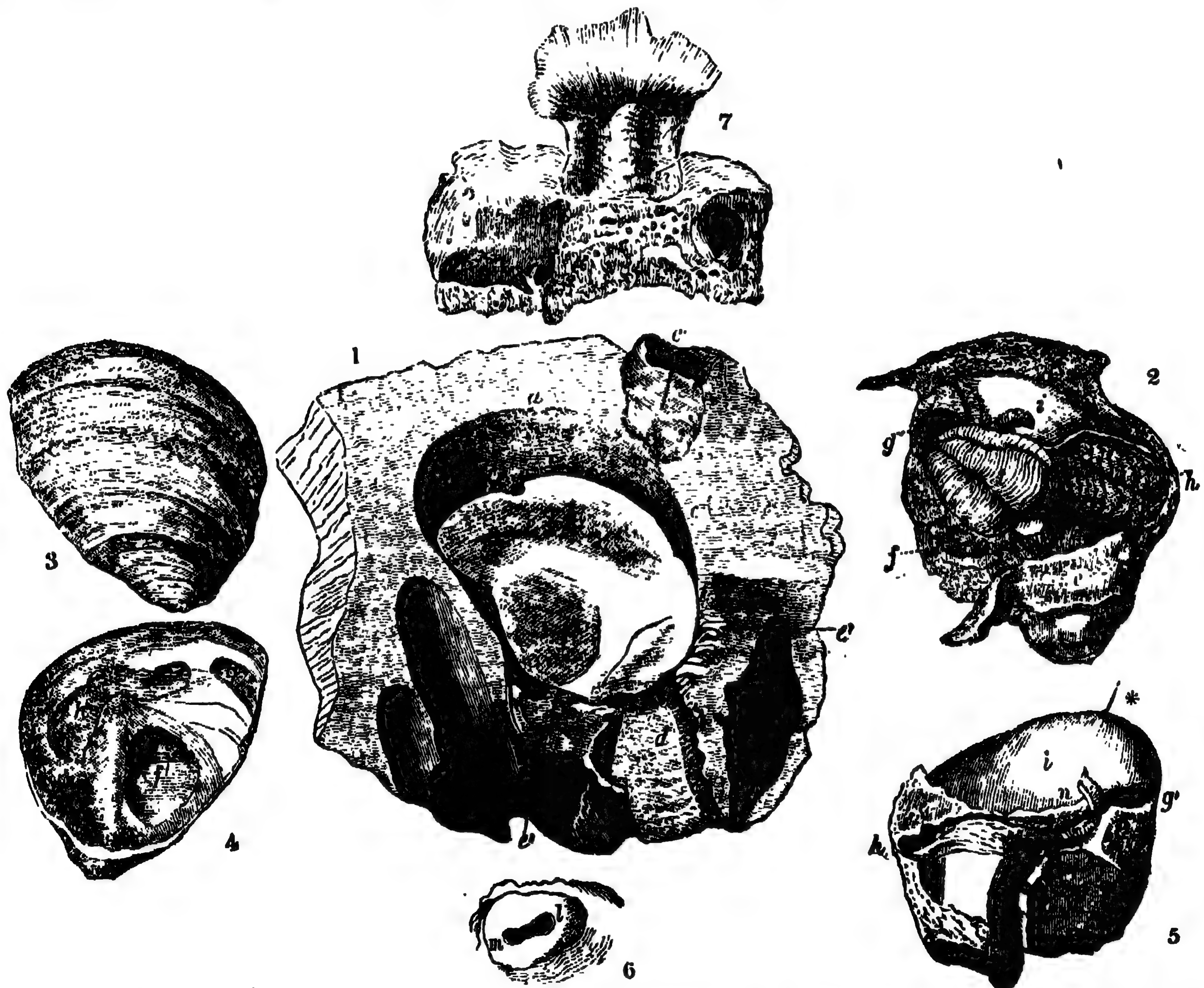


Fig. 1, part of calc. grit rock containing the fixed valve and part of the tube of Clavagella lata; *fig.* 3, external view of the right or free valve; *fig.* 4, internal view of same, showing the muscular impressions corresponding with those of the left or fixed valve; *fig.* 2, soft parts of Cl. lata seen from the right side the dermal layer of the mantle, *e*, being removed; *fig.* 5, the same seen from the left side, or that which is in contact with the fixed valve. The extremities of the left labial appendages only are exposed, no part of the gill being protruded. A bristle is placed in the opening of the mantle; *a*, anterior wall of the chamber; *b*, dorsal wall; the letter placed on the hinge of the fixed valve; *c*, ventral wall; *d*, posterior or siphonic outlet; *e*, tubular communications with a neighbouring cavity, here sent off from the posterior part of the mantle; *e'*, *e'*, calcareous tubes secreted by the above processes and extending into the cavities contiguous to the throat of the tube; *e''*, a cavity communicating with the anterior part of the chamber; *f'*, impression of the posterior adductor muscle; *g'*, impression of the anterior adductor muscle; *h'*, impression of the pallial muscle, or third adductor; *f*, posterior or large adductor (the single adductor of the *Ostracea*, *&c.*, corresponds to this, the following are superadded in other families of *Bivalves*); *g*, the anterior, anterodorsal, or smaller adductor; *h*, the pallial or antero-ventral adductor; *i*, the convex muscular mass continued over the anterior part of the body, and reducing the opening of the mantle to the small slit,* through which a bristle is placed in *fig.* 5; (this mass is an inordinate development of what forms the muscular margins of the mantle lobes in other bivalves); *k*, muscular fibres of the siphon; *l* (*fig.* 6), the respiratory, or ingestive siphonic canal; *m*, the anal, or egestive siphonic canal; *n*, the labial or buccal appendage; *t*, the gills: in *fig.* 2 the right gill is seen partially protruded between the muscular parts of the mantle; *x*, part of the ovary (figures and description from Owen, to whose lucid memoir and illustrations the reader is referred for the anatomy of the internal parts); *fig.* 7, anterior termination of the shelly tube of *Clav. aperta*, *Sow.*, from Mr. Sowerby's Genera of Recent and Fossil Shells.

* John Hunter's paper in the 'Philosophical Transactions' for the year 1772, 'On the Digestion of the Stomach after Death,' and Spallanzani's experiments on that organ, will readily occur to the physiologist.

it was chambered, could not have been living far beneath the surface; whereas *Clav. lata* was dredged up from a depth of sixty-six feet. Any inferences, therefore, as to the state of submersion of a rock during the life of the fossil species of *Clavagella* which there occur, should be made with caution by the geologist.'

Geographical Distribution.—The diffusion of the genus, though now comparatively rare in cabinets, is probably wide. A sharp investigation of masses of coral and of submerged perforated rocks or stones, particularly in warm climates, is very likely to be rewarded by the discovery of *Clavagellæ*.

Probable place in the Natural System.—Mr. Owen is of opinion that the organization of *Clavagella*, like that of *Aspergillum* described in the 'Reise von Afrik' of Dr. Rüppell, is modelled on the type of the *Acephalous Bivalves*, and that it follows most closely, in the variations from that type, the modifications which have been observed in *Gastrochœna*. The lengthened worm-like figure of *Aspergillum* is exchanged in *Clavagella*, observes Mr. Owen, for a shorter form with greater lateral development: and instead of the small rudimentary valves, which are enchased, as it were, in the calcareous sheath of *Aspergillum*, we find them here largely developed, and one of them always remaining at liberty, to be applied by a powerful muscular apparatus to those offices which are essential to the forcible expulsion of the fluid in the branchial cavity, and probably to assist in the excavation of its secure abode.

FOSSIL CLAVAGELLÆ.

Mr. Broderip says that no fossil species appear to have been detected below the supracretaceous group. M. Deshayes, in his tables (Lyell, 3rd vol., ed. 1833), gives two living and seven fossil (tertiary) species, and one (*Clavagella aperta*, Sowerby) as found both living and fossil (tertiary). He gives the Mediterranean and Indian Ocean as the habitation of the living animal, and Sicily (Pliocene Period of Lyell) as the locality of the fossil. In his edition of Lamarck he makes the whole number (living and fossil) seven, the seventh and last species being *Clavagella aperta;* but he refers to Rang's 'Manuel' for a second living species. (See the 'Manuel' and Mr. Broderip's paper above referred to.) In Deshayes's edition of Lamarck the species *Clav. echinata* is followed by *Clav. cristata*, and the editor, in a note referred to from the latter, says that these two species should be united, as they only differ in size and age. He also observes that the free valve of *Clav. cristata*, or of *Clav. tibialis*, has been placed by Lamarck among the species of *Glycimeris* under the name of *Glycimeris margaritacea*. And here we may mention the difficulty of laying down specific characters from the valves, which being, as Mr. Broderip remarks, nearly, perhaps altogether, excluded from the light, colour, at best but a treacherous guide, is absent entirely; while the shape of the chamber and of the valves, together with the comparative roughness or smoothness of their outer surfaces, may depend upon the greater or less degree of hardness of the material in which the chamber is formed.

CLAVA'TULA. [SIPHONOSTOMATA.]

CLAVELLI'NA (Zoology), Savigny's name for a subgenus of ASCIDIDÆ, with a gelatinous envelope or test, supported like *Boltenia* upon a peduncle, and having the branchial sac without plaits, but not penetrating to the bottom of the envelope. Mr. W. S. Mac Leay (*Linn. Trans.*, vol. xiv., p. 539) observes that those figures of *Boltenia*, which represent them as supported vertically on a rigid peduncle, give them an unnatural position; that is, a position where the branchial pouch, and consequently the œsophagus, instead of descending, ascend. The peduncle, indeed, he adds, is clearly flexible in a natural state, in order that its drooping by the weight of the body may give this last a position analogous to that of other *Ascididæ*. When such animals exist, supported by a rigid peduncle, this must be inserted at the other extremity of the body, as in *Clavellina*, the compound family of *Botryllidæ*, and perhaps *Ascidia globularis* of Pallas and Lamarck. It seems, according to Mac Leay, necessary for the digestion of *Ascididæ*, if we may judge from their general construction, that the intestinal canal should form a loop or *ansa*. This loop may be either ascending, as in *Boltenia*, or descending, as in *Clavellina;* the only circumstance common to both genera being that the loop points towards the peduncle. Mr. Mac Leay thinks that in *Clavellina* the peduncle may possibly be a receptacle for the eggs, as in certain Cirripeds, and as it seems to be in the compound *Tunicata* of the family of *Botryllidæ*, but that whether it be also the case in *Boltenia* is not so certain. The student should refer to the second part of Savigny's admirable *Memoir upon the Invertebrate Animals* (Paris, 1816), and Mr. Mac Leay's interesting paper above quoted.

CLAVICHORD (or, improperly, *clarichord*), a musical keyed instrument, much in use till the middle of the last century, but now only to be met with as a curiosity. Its shape is that of a square piano-forte, though smaller, and the strings are struck, or rather pressed, by brass pins projecting from the further end of the keys. The tones of the Clavichord are rendered exceedingly soft by means of pieces of cloth interwoven with the strings. This softness was its great recommendation in convents, the nuns having thereby been enabled to practise without disturbing others in the dormitory.

CLAVICO'RNES (Entomology), a name given by Latreille to a subsection of Coleopterous insects of the section Pentamera.

The insects of this subsection almost always have the antennæ thickened at the apex, and frequently the terminal joints forming a club: the joints of the tarsi are usually entire.

Such are the principal characters of the subsection Clavicornes, a group in which Latreille includes the families *Scydmænidæ, Histeridæ, Silphidæ, Scaphididæ, Nitidulidæ, Dermestidæ, Byrrhidæ*. We thought it proper to notice this subsection, since it is adopted by many of the continental entomologists. It appears to us, however, to include many genera of insects, which, in a natural arrangement, ought not to be associated under one head.

CLA'VIGER. [PSELAPHIDÆ.]

CLAVI'GERO, FRANCESCO SAVERIO, was born at Vera Cruz, in Mexico, about 1720. He entered the order of Jesuits, and was sent as missionary among the Indians in various parts of Mexico, where he says, in the preface to his work, he spent thirty-six years, visiting the country in every direction, living at times entirely among the Indians, whose language he learned, collecting their traditions, and examining the historical paintings, MSS., and monuments relative to the antient history of the aboriginal tribes, with the view of writing a correct account of Mexico; since he had found, on reading the Spanish authors who had preceded him, that their works were disfigured by many errors and misrepresentations. After the Jesuits were suppressed by Spain in 1767, Clavigero left Mexico for Italy, where the Pope granted to the expelled fathers an asylum in the States of the Church. Clavigero, and others of his brethren from Spanish America, had the town of Cesena assigned to them as their residence; a circumstance which gave Clavigero a good opportunity of comparing his own information with that collected by his brother missionaries in various provinces of Spanish America. He now set about writing his History of Mexico, which he published in Italian, 'Storia antica del Messico cavata dai migliori Storici Spagnuoli, e dai Manoscritti e dalli Pitture antiche degl' Indiani,' 4 vols. 4to. Cesena, 1780-1, with maps and plates, which he dedicated to the learned Carli. In the first volume, after a long and critical list of all the Spanish writers on Mexico, the author gives an account of the countries constituting that empire; of their natural history, of their early inhabitants, their various migrations, and of the establishment of the dominion of the Aztecs, and concludes with a sketch of the political state of the country when Cortez landed on its shores in 1521. The second volume treats of the manners, customs, arts, sciences, and language of the people. The third, which contains the account of the conquest by Cortez, is written with great impartiality. The author feels as a Mexican rather than a Spaniard. The fourth volume consists of dissertations on the physical and moral constitution of the antient Mexicans, on their progress in the arts and sciences, on their religion, on the proper boundaries of the empire of Anahuac; and lastly, the author gives a list of works written in the various native languages since the conquest, either by Spaniards or natives. Clavigero indignantly refutes the assertions of Paw, Raynal, and others, who chose to consider the Indians of America as an inferior race, little removed from the brute creation. In these dissertations Clavigero has at times shown more industry and honest zeal than critical discrimination. His work,

however, is, upon the whole, the best that has been written on antient Mexico; Humboldt, Navarrete, and other recent writers often refer to it. [AZTECS.] It was translated into English by C. Cullen: 'The History of Mexico,' 2 vols., 4to., London, 1787. Little is known of Clavigero's private life. He died in the Papal State towards the end of the last century. Clavigero, although the author of a most important Italian work, has been singularly neglected by the Italian bibliographists and biographists. His name is not even mentioned in Lombardi's 'Literary History of Italy in the Eighteenth Century.'

CLAVIPA'LPI (Entomology), according to Latreille, the seventh family of Tetramerous Coleoptera.

The insects of this family are principally distinguished by the antennæ being terminated by a perfoliate club. The tarsi are generally furnished with a velvet-like substance beneath, and have the penultimate joint bilobed; some few, however, have the tarsi simple. The mandibles are emarginated or dentated at the apex; the maxillæ are armed on the inner side by a tooth-like process; the palpi have the terminal joint large. Many of the species of this group feed upon fungi and boleti, and their form is often rounded and convex. The genera included in the family Clavipalpi are *Erotylus*, *Triplax*, *Languria*, *Phalacrus*, *Agathidium*, and some others.

CLA'VIUS, CHRISTOPHER, of Bamberg, entered into the order of Jesuits, and died at Rome February 5, 1612, aged 75. He was selected by Gregory XIII. to superintend the reformation of the Calendar, in which capacity he had to endure and reply to the attacks of Mœstlinus, Joseph Scaliger, Vieta, and others of less note. As a mathematical writer, Clavius is distinguished by the number of his works, the frequency with which they were reprinted, his rigid adherence to the geometry of the antients, and the general soundness of his views. According to Riccioli (*Chronicon, Nov. Almag.*), the most learned Germans resorted to Rome, that they might converse with Clavius, and several were accustomed to say that they would rather be attacked by him than praised by others. As Clavius did not possess any great original talent, his works are now of little consequence, except to the mathematical historian. The following is the list of those which have been mentioned by succeeding writers:—

(1.) In 'Sphæram Johannis de Sacro-bosco Commentarius,' Rome, 1570, reprinted more than a dozen times: the last edition we can find is that at Leyden, 1618. (2.) The Works of Euclid, with a commentary; Rome, 1574; Cologne, 1591; Frankfort, 1607, &c., &c. (3.) 'Epitome Arithmeticæ Practicæ,' Rome, 1583; Cologne, 1637, &c. (4.) Edition of the Spherics of Theodosius, with a Table of Sines, Tangents, &c.; Rome, 1586. (5.) A work on Gnomonics, Rome, 1587; several times reprinted. (6.) 'Defence of the Calendar against Moestlinus;' Rome, 1588. (7.) 'Fabrica et Usus, &c.,' a work on Horology; Rome, 1586; 'Constructio, &c.,' a second work; Louvain, 1595; 'Horol. Nov. Descr., &c.,' a third; Rome, 1599. (8.) On the Astrolabe, Rome, 1593, &c. (9.) Refutation of J. Scaliger on the Calendar, Rome, 1595; Mayence, 1609. (10.) 'Romani Calendarii a Greg. XIII. Restituti Explicatio,' Rome, 1603. This is to us the most important of the works of Clavius: it contains the description of the reasons and methods employed in the alteration of the calendar, with the answer to Vieta and others. (11.) 'Elements of Algebra,' Rome, 1604. (12.) 'Geometria Practica,' Rome, 1604. (13.) 'Refutation of George of Wirtemberg on the Calendar,' Rome, 1610. We have taken the earliest editions which we could find in any of the authors cited at the end.

A complete edition of the works of Clavius was published at Mayence in 1612. The account of the Calendar is in the fifth and last volume. (Riccioli, Weidler, Blancanus, Lipenius, Bouillaud (*Cat. Bibl. Thuan.*), Lalande, Delambre.)

CLAVULA'RIA. [ZOOPHYTARIA.]

CLAVULI'NA, D'Orbigny's name for a genus of his family Hélicostègues, order Foraminifères. [FORAMINIFERA, SYMPLECTOMERRA.]

CLAY, any natural mixture of earths which breaks down or disintegrates in water, and affords a plastic ductile mixture. It depends upon this property, rather than colour or composition, whether an earthy body belongs to the class of clays. There are many varieties of clay used for different purposes.

Pipe-clay is of a greyish-white colour, has an earthy fracture, and a smooth greasy feel; it adheres to the tongue, and is very plastic, tenacious, and infusible. Its name shows the purpose to which it is applied. It is found near Poole in Dorsetshire.

Potter's clay is of various colours, and disintegrates by exposure to the air; when mixed with sand, it is made into bricks and tiles. It is found in Hampshire, Berkshire, Devonshire, and is largely used in the Staffordshire Potteries. The Hampshire clay yielded by analysis,—

Silica . . .	51
Alumina . . .	25
Lime . . .	

with some oxide of manganese and water

Stourbridge clay has the general properties above described, but is of a dark colour, owing apparently to an admixture of carbonaceous matter. It is most extensively employed in the manufacture of crucibles, and especially for those used in glass-making. It is extremely refractory in the fire. It yielded by analysis,—

Silica	57
Alumina	30
Moisture	12·6

A trace of iron and carbonaceous matter.

It appears to have originated from the disintegration of shale.

Brick clay, or loam, varies much in appearance, texture, and composition; its colour is dependent upon the proportion of oxide of iron which it contains. It lies in abundance upon the London clay, and frequently rests upon an interposed bed of sand. The organic remains found in it are few, but it sometimes contains the teeth of elephants.

London clay is a very extensive deposit of a bluish clay, except near the surface, where it has often the usual clay colour. It forms the greater part of Middlesex, the whole of Essex and Suffolk, and part of Norfolk, and frequently rises almost to the surface. Some of the lower beds are yellowish white or variegated. This clay occasionally includes beds of sandstone, and of a coarse argillaceous limestone, of which Parker's Roman cement is made. It contains also frequently the bones of the crocodile, turtle, &c.

Plastic clay skirts the London clay within the London chalk basin, and it appears also at the Isle of Wight. This formation consists of a variable number of sand, clay, and pebble beds irregularly alternating, lying immediately upon the chalk; it contains some appearance of coal, decidedly of vegetable origin, pyrites, oyster-shells, and the branches of trees. The sand-beds of the plastic clay formation are the grand reservoir of soft water from which the deep wells in and round London are supplied.

Porcelain clay is of various shades of white; it is dull and opaque; occurs friable or compact; feels soft to the fingers, and adheres to the tongue. It is infusible, and its specific gravity is 2·216. A large tract of this clay, which includes crystals of felspar, quartz, and mica, occurs near St. Austell, in Cornwall. The porcelain manufactures of Worcester are supplied from it; according to Wedgwood, it consists of 60 parts alumina and 40 silica. It probably arises from the decomposition of felspar. The porcelain clay of China is called *Kaolin*. This clay occurs in France, Saxony, and Austria. Various other kinds of clay are met with in different situations; their nature and composition depend upon those of the rocks from the disintegration of which they have been formed; thus slate, steatite, and trap, each yields a different kind of clay.

Clay is an essential component part of all fertile soils. A clay soil consists of a large proportion of alumina [ALUMINA] united to silica of various degrees of fineness, and frequently also a portion of carbonate of lime. When the silica is very fine and intimately mixed with the alumina, the clay, although stiff in appearance, is fertile in proportion to the humus which it contains, or which is artificially added to it. It then forms that class of rich wheat soils which produce many successive abundant crops without change or manure. It has a strong affinity for water, which prevents the plants that grow in it being injured by drought; and it has a sufficient degree of porousness to allow superfluous moisture to percolate without making it too soft. All that is required for such a soil is a porous substratum of rock or gravel; and where this is not the case, sufficient under-drains must be made to produce the same effect. The clay soils in Britain are not in general of this fertile kind. They are of a compact nature which retains the water; and the various oxides and

salts of iron which they contain are mostly injurious to vegetation. Hence they require expensive draining, and manuring, to render them productive. This has made lighter soils, which are more easily worked, to be generally preferred, although naturally less adapted to the growth of wheat; and the mode of cultivation of the light soils has advanced more rapidly towards perfection than that of the clays. Yet the latter will undoubtedly repay the outlay best, when once they are brought to a certain state of improvement. When clay soils are well drained, and when the effect of noxious salts has been removed by liming, burning, and frequent stirring, it will be found that a much smaller quantity of manure will produce a certain return in grass or corn, than on any light soil. The great difficulty is to choose the time when stiff clays are to be worked; and here it may be observed, that ploughing sometimes does more harm than good. When clay is wet, especially in the beginning of summer, and it is ploughed in the regular process of fallowing, the tough moist slice cut out by the plough is set on edge, and the sun bakes it into a hard mass like brick. In this state it is not improved by exposure to the air, which cannot penetrate this hard substance. It would be much better to plough out deep water-furrows with a plough made on purpose, and wait until the moisture is reduced by gradual percolation and evaporation; so that the plough should raise a slice ready to break and crumble as it is turned over. This should be done immediately before winter, and then the frost will so divide and mellow the soil, that, provided it be kept free from superfluous water by under-drains and water-furrows, it will have the appearance of the finest mould when worked with the harrows in spring. To plough it again would be to spoil all. It should have received the necessary manuring in autumn, and be ready for the seed to be sown on this pulverized surface. The horses which draw the harrows or the sowing machines should be made to walk in the furrows, which should afterwards be deepened out with the spade, or by a plough constructed for the purpose. A free course and outlet should be formed for all surface water; for no maxim is more true than this, that stiff clays are never injured by a continuance of dry weather, unless they were in a wet state immediately before. The dryest clay contains sufficient water to supply the roots of plants for a long time; but wet clay in drying and shrinking destroys the texture of the roots by mechanical pressure. This may be of use when weeds are to be eradicated, and in that case a different mode of proceeding may be recommended; but when good seed is sown, the clay should be in such a state as to crumble under the harrows, and it should not be too moist. Experience has taught the ploughman, that clay soils should be laid in round lands or stitches: and much of the produce of a field depends on the skill with which this is done. It is not only the surface which should lie in a rounded form, but the bottoms of the furrows should lie in a regular curve, without small ridges or inequalities between them; so that when heavy rains penetrate through the whole thickness which the plough has raised, the water may find its way into the intervening furrows, without being retained by the small ridges left by an unskilful ploughman. It is seldom that a common labourer can be made to perceive the consequences of his carelessness. The slightest inclination of the plough to either side makes an inclination in the bottom of the furrow. An inequality in the depth does the same. The usual method is to increase the depth of the ploughing from the crown of the stitch to the outer furrow. If the land has been cross-ploughed or dragged level before the last ploughing, this may answer the purpose; but if the stitches are only reversed, and the centre of the new stitch is to be where the water-furrow was before, it requires twice ploughing to bring the stitch to its proper form, and this is not always done, for fear of treading the land too much. Hence it is always preferable, where it can be done, to lay the land flat by cross-ploughing and harrowing before it is raised in stitches. The narrower the stitches are, the dryer the land will lie. The most convenient width is five bouts, as it is called, that is, five furrows on each side of the centre, which, allowing 9 inches for each furrow, makes 7½ feet, leaving 18 inches for a water-furrow, which is deepened into a narrow channel in the middle.

We have been thus particular in describing the management of clay land, because it seems not so generally understood, and there is great room for improvement in the common modes of cultivation. Fallowing for wheat is the old system on clay soils, and continues to be so in nine farms out of ten; but it often happens that in a wet season the whole advantage of the repeated ploughings is entirely lost, the land sown with wheat is neither enriched nor improved by all the tillage bestowed upon it, and is as full of weeds as it was when first broken up from the preceding stubble. The better system is to clean the land well in summer, after it has borne a crop of winter tares, which have been cut green or fed off by sheep in May or June, and to lay it up high and dry for the winter, after having given it the proper liming and manuring; to sow it with oats and grass seeds in spring, keep it in grass as long as is convenient, and break it up in autumn. Wheat may then be sown; or it may have the benefit of another winter's frost, and beans may be drilled or dibbled early in spring. After harvest the bean stubble may be cleared with harrows or scarifiers, and the seeds allowed to vegetate; the plough will then destroy them. A good crop of wheat may be depended upon after this, if the land is in good heart; if not, it should have been manured for the beans: but if the grass was fed off the preceding year, and the land well managed before, it cannot fail to be in good heart. Clay land will bear a repetition of the same crops much oftener than lighter lands; but every scientific agriculturist knows the advantage of varying the produce as much as possible, making plants of different families succeed each other. The cereal grasses are of one family, which is the reason why wheat, barley, oats, rye-grass, &c., do not succeed so well after each other as after leguminous plants or clover, and that turnips, besides cleaning the land by the repeated hoeings given them, are so good a preparation for corn. A good rotation for stiff clays is yet a desideratum in agriculture; and although we will not affirm that fallows can be entirely dispensed with, we are persuaded that they might be separated by much larger intervals than is usually done. And if advantage is taken of early seasons, at least in the southern parts of the island, most lands may be kept clean by what is called a bastard fallow immediately after harvest, without losing a crop. We will go farther, and assert that instead of three crops in four years, which is the common method, and an improvement on the old system of two crops and a fallow, five might easily be obtained, especially if tares and trifolium incarnatum are considered as crops. For example: 1. Oats or barley; 2. Clover; 3. Wheat; 4. Trifolium cut in May, and succeeded by spring tares, cabbages, or potatoes. At all events the trifolium or winter tares may always be had in the year in which the land is to be cleaned by repeated ploughings; as they may be cut early in summer, and leave ample time for the operations.

The most profitable management of a stiff wet clay soil, after thorough draining it, is to cultivate it on the convertible system; that is, to have it three years in grass and three years under the plough, unless a permanent and good sward can be obtained upon it, in which case it will give the surest return by remaining in grass. A preliminary course of cropping with ample manuring will so much improve the texture of the surface, that a much better herbage will grow upon it; and when this is well established, it may be left so until it degenerates.

The great disadvantage of clay soils in a moist climate like that of Great Britain arises from an excess of water, and the obvious remedy is perfect draining of the subsoil. This is effected by numerous hollow drains judiciously arranged to convey the water to a proper outlet. An instrument has been lately invented or improved by which this is done effectually, and at a comparatively small expense. [Draining.]

Clay is extensively used in many parts of England to improve light land, by being carried on the surface in considerable quantities, but this is chiefly where it approaches to the quality of marl, by having a considerable portion of calcareous earth in its composition.

The effect of burnt clay as a manure has been highly extolled, and not without some reason in particular situations. Clay by burning alters its nature; it becomes insoluble in water, and loses its attraction for it; it then resembles silicious sand, and may greatly improve a very strong retentive clay, tempering it and rendering it more porous To burn clay, it is dug out in lumps and dried; heaps are made of these at regular distances in a field, with a small cavity in the centre, in which dry furze and brushwood are

introduced. This being lighted, the fire is allowed to burn very slowly, and the smoke kept in by adding a sod or clod wherever it bursts out. When the heap is once burning more clay may be added, even without being dry, and the combustion goes on without other fuel. It must be so managed as to bake the clay without heating it too much; and when the heaps are cooled and opened the whole should appear pulverized, and of a red colour if oxide of iron exists in the soil. A coat two or three inches thick spread over a field and ploughed in will greatly improve its texture; but sufficient animal or vegetable manure must be added to make it fertile.

CLAY SLATE. [SLATE.]

CLAYTON, ROBERT, Bishop of Clogher, was born at Dublin in 1695, and educated at Westminster School and Trinity College, Dublin. He was successively appointed to the sees of Killala, Cork, and Clogher, although his orthodoxy seems to have been very doubtful from his first entrance into the church. His preferment was chiefly owing to a lady who was connected with his family by marriage—Mrs. Clayton, afterwards Lady Sundon, who was one of Queen Caroline's chamber-women. His first published work was 'An Introduction to the History of the Jews.' This was followed by 'The Chronology of the Hebrew Bible vindicated' (published in 1747). 'A Dissertation on Prophecy' (in 1749): and 'An Essay on Spirit' (1751). This essay, which was full of the notions contained in what is called the Arian heresy, gave great offence to the Church, and prevented his being promoted to the archbishopric of Tuam. There is some doubt whether Clayton was really the author of it, but he soon avowed all the sentiments which it contained, and even more, in his 'Vindication of the Old and New Testament, in answer to the Objections of the late Lord Bolingbroke, in Two Letters to a young Nobleman;' which was published at different periods in three separate parts.

On the 2nd of February, 1756, he made a motion in the Irish House of Lords for the expunging of both the Athanasian and Nicæan Creeds from the Liturgy. The motion, which did not find a single supporter in the House, created a violent storm at court and out of doors; and when he renewed his attack in the following year, in the third part of his 'Vindication of the Old and New Testament,' &c., it burst upon his head. The king instructed the lord-lieutenant to bring on a legal prosecution of the bishop, but before the day fixed for the opening of the proceedings he was carried off by a nervous fever. He died February 26, 1758.

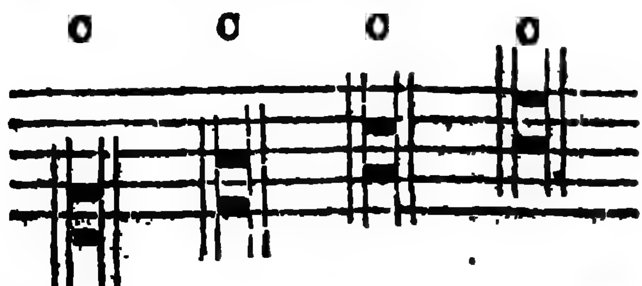
Besides the works already mentioned, he published 'A Journey from Mount Sinai and back again,' from a MS. written by the Prefect of Egypt, in company with the missionaries of the Propaganda; to which are added some 'Remarks on the Origin of Hieroglyphics, and the Mythology of the ancient Heathens.' He was a man of great generosity and benevolence, and his charities were frequently well directed. He gave away many reels and spinning-wheels to the poor about Clogher, encouraging industry, and teaching them to provide for themselves.

CLEF (Fr. *clef*, a key), in music, a character placed at the beginning of the staff, to give names to the lines and spaces, and determine the acuteness or gravity of each note.

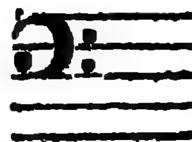
There are three clefs—the *treble*, the *mean* (or C clef), and the *base*. The *Treble Clef* is now only placed on the second line, which it names G.



The *Mean Clef* gives the name of C to any line on which it is placed: it is called the *soprano clef* when placed on the 1st line, the *mezzo-soprano* when on the 2nd, the *alto*, or *contratenor*, or *countertenor*, when on the 3rd, and the *tenor* when on the 4th.



The *Base Clef* is now placed only on the 4th line, giving it the name of F.



The treble clef is appropriated to female and boys' voices, and to instruments whose scales run high. Of the four kinds of *mean clef*, the first is used for female and boys' voices; the third and fourth for men's voices, also for the viola, the two higher trombones, and occasionally for the clarinet and violoncello. The *base clef* is appropriated to the lowest male voices, and to instruments the scales of which run deep.

In the 17th century the treble clef was used on both 1st and 2nd lines, and the base on both 3rd and 4th. The correction of so great an evil was a step towards simplification; and, in 1672, a distinguished mathematician (Thomas Salmon, M.A., of Trinity College, Cambridge) published his plan for a complete amelioration, by the abolition of all clefs, and substituting for them one universal character. The plan was simple and feasible, but immediately, violently, and successfully opposed by the musicians of the day, at the head of whom, we regret to say, was Matthew Lock. Thus was strangled in its birth a most rational attempt to remove much of the difficulty attending the practice of music. The C clef is now gradually falling into disuse, but we fear that its final rejection is not near at hand, and that a long time will elapse before other desirable reforms in music—reforms that would remove many of the impediments to the practice of the art—will be accomplished, so blind and so strong is prejudice.

CLEIDOTHÆRUS, a genus of Acephalous mollusks (Conchifers of Lamarck), established by Mr. Samuel Stutchbury for a testaceous animal, the mechanism of whose hinge connecting the two valves differs most materially from that exhibited by other bivalves.

Shell bivalve, somewhat pearly, inequivalve, involute, attached by the outside of the larger valve. Hinge with a small conical pointed tooth in the free valve, fitting into a corresponding pit in the attached valve. A testaceous, rather elongated, curved appendage, connected by cartilage, is inserted into a deep cicatrix within each umbo; muscular impressions, two in each valve, lateral, the anterior ligulate, the posterior suborbicular. Muscular impression of the mantle entire. Ligament external. (Stutchbury, modified by G. B. Sowerby.)

M. De Roissy had separated the genus from *Chama*, with which it might be easily confounded by a superficial observer under the name of *Camostrée* (*Chamostrea*), but he does not seem to have been aware of the appendage, and, as Mr. Stutchbury observes, his name is entirely inapplicable, there being nothing in the shell to connect it with *Ostrea*. Example, *Cleidothærus Chamöides*. (Stutchbury.)

Description. Shell involute, brownish red, internally of a greenish pearly lustre, attached by the anterior side of the right valve, which is of great depth; left valve but slightly convex; the clavicular appendage with a groove on the convex side. (Stutchbury.)

Locality.—Mr. Stutchbury states that *Cleidothærus Chamöides* was found attached to sandstone rocks by T. Young, Esq., R.N., together with an *Aspergillum* (perhaps *agglutinans* of Lamarck), some *Chamæ*, &c., while searching near the entrance of Port Jackson, pointed out to him as the spot where Mr. Stutchbury discovered, in 1826, the first living *Clavagellæ*. Mr. G. B. Sowerby says that some imperfect specimens had been sent to England many years ago, probably from the same spot, by Mr. A. Humphrey. Some of these were of a brownish red colour, whereas those procured by Mr. Young were of a dull livid colour. The imperfection of the specimens above alluded to consisted in their having lost the internal appendage. All the specimens had adhered by the anterior side of the large and deeper valve. Mr. Stutchbury says that in general contour this shell has so great a similitude to Chama, that without opening it there would be no hesitation in pronouncing it of that genus, belonging to Lamarck's division, 'Crochets tournant de droit à gauche;' a division which it seems will not bear the test of examination. [CHAMACEA.*]

* Lamarck and Deshayes both make *Diceras* feminine; and the cut [Article CHAMACEA], in conformity with them and other zoologists, is named *Diceras arietina*; but there can be no doubt that, correctly, it should be *arietinum*, *Diceras* being a Greek noun from κέρας, a horn. In the same article, p. 470, 2nd column, line 23rd upwards from the cut, for *Chama* read *Chamæ*.

Mr. G. B. Sowerby is of opinion that as far as the character of the internal hinge cartilage having an elongated testaceous appendage goes, *Cleidotherus* connects the *Camacées* (*Chamæ*) of Lamarck with his *Myaires*. For figures and further description, the reader is referred to the *Zoological Journal*, vol. v., p. 97; *Tab. Supp.* xlii., figs. 5, 6, 7, 8; and Mr. G. B. Sowerby's *Genera of Recent and Fossil Shells*, No. xxxii.

CLEI'STHENES, an Athenian, one of the family of the Alcmæonidæ, was grandson of Cleisthenes, the tyrant of Sicyon. After the expulsion of the Pisistratidæ (B.C. 510) he changed his line of politics and headed the democratical party: the opposite faction was conducted by Isagoras. Cleisthenes soon obtained the favour of the people, and the sanction of an oracle from Delphi enabled him to effect changes in the constitution of Attica which were productive of very important results. The four tribes into which Attica had antiently been distributed gave place to a division altogether new. He made ten tribes, called severally from the name of some hero: each tribe contained a given number of demi (δῆμοι), or townships, which were under the direction each of a demarch (township-governor). Every citizen was obliged to have his name enrolled in the register of some township. Many other changes were also effected. The senate was increased from 400 to 500; 50 were sent by each tribe. The process of ostracism is said to have been first formally established by Cleisthenes. The Spartan king Cleomenes, acting on the suggestions of Isagoras, insisted on the expulsion of Cleisthenes and the *accursed* persons. (Herod. v. 70.) Cleisthenes left Athens (Herod. v. 72), but waited a favourable opportunity for prosecuting his schemes. Seven hundred families were banished at the same time. (Herod. v. 72.) When Cleomenes and Isagoras were besieged in the citadel which they had occupied, and were forced to capitulate, they left Athens with the Spartan troops, and Cleisthenes with the 700 families returned in triumph. [ATTICA.] (Thirlwall's *Greece*, vol. ii. pp. 73—80; Niebuhr's *Rome*, vol. ii. p. 305, &c. *Eng. transl.*)

CLE'MATIS, a genus of climbing plants belonging to the natural order *Ranunculaceæ*, and characterized by having a valvate coloured calyx, carpels in a ripe state terminated by long feathery styles, and opposite leaves. The most common species is *C. vitalba*, the 'Traveller's Joy,' which runs over the hedges in many parts of England, loading them first with its copious clusters of white blossoms, and afterwards with heaps of its feather-tailed silky tufts. It is however better known from some of the exotic species being favourite objects of cultivation. *C. flammula*, a species with panicles of small white flowers, is among the most fragrant of plants. *C. cirrhosa, crispa, et florida*, are remarkable for the large size of their greenish-white flowers; while the purple or pink bells of *C. viticella*, hanging gracefully from its festooning branches, render that species, when well managed, one of the most elegant and ornamental of climbers. Atragenes, Siberian and Alpine plants, with finely-cut leaves and delicate purple flowers, considered a peculiar genus by Linnæus, are other species of Clematis. They have a climbing habit, and are occasionally seen in gardens; their stems however are apt to become naked, and they are not so generally cultivated as the species of genuine Clematis.

All these plants are hardy; but they are impatient of damp in winter. The latter circumstance is therefore to be attended to by those who wish to ornament their gardens with them.

CLE'MENCE, ISAURE, a French poetess, born near Toulouse, but at what time has been a matter of much dispute. The first known writer who spoke of her is Guillaume Benoit, a jurist of the fifteenth century, who says that she instituted the floral games, 'jeux floraux,' at Toulouse, which were held yearly on the 1st of May, and that she instituted prizes for those who distinguished themselves in various kinds of poetry. The prizes were a gold violette, a silver eglantine, and a gold souci or marigold. This distribution of prizes continued till the Revolution. The capitouls or echevins of Toulouse distributed the prizes, on which occasion an eulogium was recited in memory of Clemence Isaure, and her statue in the Hôtel de Ville was crowned with flowers. In 1527, Etienne Dolet, a writer and printer at Lyon, who was hanged and burnt for heresy in 1546, wrote an eulogium of Clemence in Latin verse, with the title, 'De Muliere quadam quæ Ludos literarios Tolosæ constituit.' These writers were followed by numerous others, and among them De Thou and the President Berthier, who wrote about Clemence, and placed her existence in the fourteenth century. Catel, however, in his *Mémoires du Languedoc*, expressed doubts on the subject, and treated the existence of Clemence as fabulous. Dom Vaissette, *Histoire du Languedoc*, supports the personality of Clemence, and her foundation of the prizes, as proved by tradition, instruments, and public documents in the Hôtel de Ville of Toulouse. In 1775 a Memoir appeared, in which Clemence Isaure is stated to have lived in the latter half of the fifteenth century. This controversy seems to have originated in having attributed to Clemence Isaure the original foundation of the poetical academy known by the name of the floral games. But that academy was founded long before Isaure by the troubadours, and was called the college of 'la gaie science,' or 'gai scavoir.' The first authenticated meeting on record dates from the year 1323; they then assembled in a garden outside of Toulouse. The registers of this college, till about 1500, make no mention of Isaure. It may be about this latter period that she founded the prizes of gold and silver flowers, from which the academy took its more recent name. The accounts of Isaure's life and adventures which are found in several compilations appear very problematic. (*Encyclopédie Méthodique, Histoire*, art. 'Isaure;' and Moreri's *Dictionnaire*.)

CLEMENS, TITUS FLA'VIUS ALEXANDRI'NUS, was born about the middle of the second century of our æra. According to St. Epiphanius he was an Athenian, and at first a follower of the Stoic philosophy; but according to others he belonged to the Platonic school, an opinion which seems countenanced by the manner in which he speaks of Plato and his philosophy in many passages of his writings. He says in his Stromateis (lib. i.), that 'he had for teachers several learned and excellent men; one an Ionian, who lived in Greece, another from Magna Græcia, a third from Cœlesyria, a fourth from Egypt, and others who had received the Christian doctrine in the East, of whom one was from Assyria, and the other from Palestine, of an antient Hebrew family; but that at last he found in Egypt one superior to all, with whom he remained.' This was Pantænus, whom he repeatedly mentions in his works, and who kept a Christian school at Alexandria, in which capacity Clemens succeeded him. St. Jerome says that Clemens was teacher of the catechumeni in that city. He was ordained presbyter of the church of Alexandria, where he appears to have remained the rest of his life. His death is believed to have happened about A.D. 220. Among his disciples were Origen, and Alexander, afterwards bishop of Jerusalem. He left many works, in which he has mixed with the precepts of the Christian doctrine and morality, which it was his object to inculcate, much information concerning the learning, philosophy, history, and manners of the heathens. Of the earlier Christian writers, he is the most conversant with the science and learning, with the opinions and practices, of the various nations of that day; and his works are extremely interesting, as showing the state of society, both among Heathen and Christian subjects of the Roman empire at that early time. They also contain much information on antient history, chronology, and the various schools of philosophy; many extracts from antient writers, whose works are lost; and also accounts of the early heresies and schisms which divided the primitive Christian church. The works of Clemens which have come down to us are:—1. 'Exhortation to the Greeks,' 1 book. This is an exhortation addressed to the heathens to abandon their false gods, whose absurd stories and obscene adventures he exposes by the testimony of the poets and philosophers of antiquity. 2. 'Pædagogus,' in 3 books. This is a treatise on Christian education. He begins by describing the qualities required in a teacher, and also what he ought to teach his pupils; he then gives an exposition of Christian ethics, recommends temperance, decency, moderation in the enjoyments of life, and declaims against the effeminate manners and luxury of his time, against public baths, and other practices which led to laxity in morals. His satire of the vices and follies of the age is caustic and humorous, and reminds us at times of Juvenal. When we reflect that he lived under the reigns of Caracalla and Heliogabalus, we do not feel inclined to suspect him of exaggeration. 3. 'Stromateis,' (τῶν κατὰ τὴν ἀληθῆ φιλοσοφίαν γνωστικῶν ὑπομνημάτων στρωματεῖς η) in 8 books. The word stromateis he has used to mean a party-coloured

or patch-work; 'opus varie contextum,' from the multifarious kind of information, religious and profane, anecdotical, historical, and didactic, put together without much regard to order or plan. Clemens says that he adopted this want of arrangement 'to veil the doctrines of Christianity under the maxims of profane philosophy, in order to screen them from the eyes of the curious and the uninitiated, that those only who are intelligent and will give themselves the trouble of studying, may understand the meaning.' Probably also he found this style of composition better adapted for his multifarious information, and best suited to his old age, in which he apparently wrote it. In the first book he descants upon the utility of philosophy, and concludes by asserting, by the help of chronology and quotations, that the philosophy contained in the sacred books of the Hebrews was the most antient, and that other nations had borrowed much from it. In the second he treats of faith, sin and repentance; he asserts the free will of man, condemns licentiousness, commends lawful marriage with one wife and one alone. In the third he continues the preceding subject, condemns the incontinence of the Nicolaites, Valentinians, and other early heretics, and defends marriage against the Marcionites. He says the apostles Peter and Philip were married and had children. He discountenances second nuptials, without absolutely condemning them. He speaks also with great praise of virginity, when preserved for the love of God and according to his ordinances. In the fourth book he treats of Christian perfection and martyrdom, exhorting the Christians to submit to death for the love of God and of Christ. Perfection he places in the precept of loving God and our fellow-creatures. In the fifth he shows that the method of speaking by figures and symbols is very antient, both among the Hebrews and the Greeks; the Greeks, he says, borrowed most of the truths they have written from those whom they called barbarians, and especially from the Jews. This book is full of quotations from antient poets and other writers. In the sixth and seventh books he sketches the portrait of a true Gnostic, a term which with him is synonymous with that of a perfect Christian. It is a complete model of moral conduct. He combats the reproach of the Greeks about the divisions and schisms existing among the Christians. He says that schisms will arise in any community; that they were foretold by Christ; that they had existed among the heathens and the Jews; that the way to ascertain the truth is to consult the Scriptures, and the whole Scriptures, and not merely some parts of them, and to follow the tradition of the church; that there is only one universal church, older than all heresies, that it began under Tiberius, and was promulgated all over the world under Nero, while the older heresies date only from the reign of Hadrian. He then recapitulates the subjects of his seven books, and promises to begin the next by a new subject. The eighth book, as we have it in our editions, differs altogether from the rest, bein a treatise on logic. Photius, in his Bibliotheca, says, that in some editions in his time the eighth book of the Stromateis consisted of the treatise 'Can a rich man be saved?' which however is generally placed as a distinct work, after the eight books of the Stromateis. This treatise has also been published separately, with a copious and learned commentary by a professor of Utrecht. 'Clementis Alexandrini liber: Quis dives salutem consequi possit, perpetuo Commentario illustratus a C. Seegario,' 1816. Among the works of Clemens which are lost was the 'Hypotyposeis,' or Commentaries on various parts of the Scriptures, in eight books, mentioned by Photius, who quotes several passages, and severely condemns it as heretical. (Photius among the *Testimonia*, at the beginning of Clemens' works, Potter's edition.) This seems rather strange, as the other works of Clemens have been esteemed perfectly orthodox, and greatly commended by Eusebius, Jerome, and other antient fathers, with the exception perhaps of one or two obscure passages concerning the nature of Christ and original sin. The errors however ascribed to the 'Hypotyposeis,' may be accounted for in some manner by the supposition that it was an earlier work of Clemens, written before he was properly instructed in the Christian doctrines, and while he was still much imbued with his Platonic philosophy. Upon the whole Clemens is more of a Christian philosopher and moralist, than a professor of dogmatic theology. Some believe that the 'Excerpta ex Scriptis Theodoti et Doctrina quæ Orientalis vocatur,' which appear at the end of Clemens' works, as well as some other fragments, are extracts from his 'Hypotyposeis.' He also wrote several treatises, 'De Pascha,' 'De Jejunio,' 'De Obtrectatione,' &c., which are lost. Clemens' works were published, with a Latin translation, by J. Potter, 2 vols., folio, Oxford, 1715; and also at Würzburg, 3 vols., 8vo., 1780.

CLEMENT I., or CLEMENS ROMANUS, succeeded Anacletus as bishop of Rome in the latter part of the first century of our æra. The chronology of the early bishops of Rome has been the subject of much controversy. One of the earliest authorities, Irenæus, bishop of Lyon, who lived in the latter part of the second century, says, that 'when the blessed apostles, Peter and Paul, had founded and established the church at Rome, they delivered the office of the bishopric in it to Linus. To him succeeded Anacletus, after whom, in the third place after the Apostles, Clement obtained that bishopric, who had seen the blessed Apostles and conversed with them; who had the preaching of the Apostles still sounding in his ears, and their traditions before his eyes. Nor he alone, for there were still many alive who had been taught by the Apostles. In the time therefore of this Clement, when there was no small dissension among the brethren at Corinth, the church at Rome sent a most excellent letter to the Corinthians, persuading them to peace among themselves,' &c. This is the epistle which is ascribed to Clemens Romanus, by Clemens Alexandrinus, Origen, Eusebius, Jerome, and other antient fathers, as having been written by him in the name of the church of Rome to that of Corinth, and which was often read in the time of Eusebius in the churches, after the gospels, on account of the excellent precepts which it contains. Eusebius (*Hist. Ec.* iii. 13) says that Clement succeeded Anencletus, or Anacletus, in the twelfth year of Domitian (A.D. 92), and that he died in the third year of Trajan (A.D. 100), having been bishop nine years. After mentioning his epistle to the Corinthians, Eusebius says that another epistle was also ascribed to him by some, but was not generally received as genuine; and that 'there had been published not long since other large and prolix works in his name, containing dialogues of Peter and Apion, of which the antients had not made the least mention.' Eusebius wrote at the beginning of the fourth century; and Jerome, who lived half a century later, repeats and confirms the remark of Eusebius. The first epistle of Clement, which was written in the name of the church at Rome to that of Corinth, 'Dei Ecclesia quæ Romæ peregrinatur Ecclesiæ Dei quæ Corinthi peregrinatur,' and was occasioned by a schism which had broken out at Corinth among the Christians, is full of sound and charitable advice. It consists of fifty-nine chapters, and is one of the most interesting memorials of the primitive church. The second epistle, supposed also to be Clement's, is only a fragment, containing likewise moral and religious advice; but it breaks off abruptly in the middle of the twelfth chapter, and there is no evidence of its being written to the Corinthians. It is supposed to be a fragment of some other work, but whether by Clement or by some subsequent writer is uncertain. Both epistles were found at the end of the New Testament in a MS. brought from Alexandria, and were published by Patrick Junius: 'Sancti Clementis Romani ad Corinthios Epistolæ duæ expressæ ad fidem MS. Cod. Alexandrini,' Oxford, 1633; and again by H. Wootton, Cambridge, 1718. Baratier and others argue from some passages in the first epistle, that Clement wrote it before the destruction of Jerusalem by the Romans, about A.D. 67 or 68, and probably before he became bishop of Rome, though some chronologists place his pontificate about that date; but the authority of Irenæus, Eusebius, and the other old fathers, seems to be the safest on such matters. A long account of Clement's life, pilgrimages, and martyrdom, has been made out by Gregory of Tours, Nicephorus, and others, entitled 'Acta S. Clementis,' and adopted by Baronius; but it is considered doubtful, even by most orthodox Catholics. It is not quite certain that Clement suffered martyrdom. He is said by some to have been exiled from Rome, and to have died in the Chersonesus Taurica; but this is also contested by others, and apparently with sufficient reason. (Nath. Lardner, *Credibility of the Gospel History*, vol. i. part ii ch. 2.) Clement was succeeded in the see of Rome by Evaristus. Several other works have been attributed to Clement, which are evidently apocryphal, such as eight books of Institutiones or Constitutiones, &c. (Tillemont,

Mémoires pour l'Hist. de l'Eglise, vol. ii.; Du Pin, *Bibl. des Auteurs Eccles.*) Wetstein published two more epistles attributed to Clement, which he found at the end of a Syriac version of the New Testament: they are chiefly in praise of virginity, and are considered as spurious. (Venema, *Epistola ad P. Wesseling qua duas Clementis Epistolas a C. Wetstenio ad calcem Novi Testamenti nuper publicatas, Epiphanio ac Hieronymo notas fuisse in dubium vocatur*, &c., Harlingen, 1754; and Wetstein's *Reply to Venema*, Amsterdam, 1754; also Nath. Lardner's *Dissertation upon two new Epistles, ascribed to Clement of Rome*, Lond., 1753.)

One of the oldest churches at Rome on the Cælian Mount is dedicated to St. Clement; but it is not quite certain whether it was built in honour of the bishop, or of Flavius Clement, the martyr, with whom the other has been often confounded. Flavius Clement was cousin to Domitian, and his colleague in the consulship (A.D. 95), and was put to death by order of that emperor on a charge of impiety towards the gods, which is understood to mean that he belonged to the Christian communion. His wife, Domitilla, was exiled on the same charge to Pandataria. Flavius Clemens is numbered among the martyrs by the earliest ecclesiastical historians. The old church, which is believed to have been built in the fifth century, fell to ruins, and was taken down by Adrian I. towards the end of the eighth century, and rebuilt by Nicholas I. in the ninth. In the year 1725, Cardinal Annibale Albani having made excavations under the great altar of St. Clement's, found a tomb with an inscription to Flavius Clemens, martyr. A full account of it with a dissertation was published: *Titi Flavii Clementis Viri Consularis et Martyris Tumulus illustratus*, Urbino, 1727.

CLEMENT II., Suidger, bishop of Bamberg, succeeded Gregory VI. in the papal chair in 1046, and after crowning the emperor, Henry III., died the following year, and was succeeded first by Benedict IX., who had been previously deposed by the council of Sutri, and who was again obliged to abdicate, and lastly by Damasus II.

CLEMENT III., a native of Rome, succeeded Gregory VIII. in 1188. He summoned a crusade against the Saracens, in which the emperor, Frederick I., Richard of England, and Philip of France, embarked. He died after little more than three years' pontificate in 1191. He was succeeded by Celestine III.

There was also an antipope, or competitor, of the celebrated Gregory VII., who assumed the name of Clement III. from 1080 to 1101, but he is not numbered among the legitimate popes.

CLEMENT IV., a native of St. Gilles, in Languedoc, succeeded Urban IV. in 1265. He showed the same inflexible hostility as his predecessor against the Suabian dynasty of Naples, and assisted Charles of Anjou in the conquest of that kingdom, which was accomplished by the defeat and death of Manfred at the battle of La Grandella, near Benevento. Charles, in return, acknowledged himself at his coronation as feudatory of the see of Rome, and agreed to pay tribute. Conradin, Manfred's nephew, having attempted to reconquer his hereditary kingdom, was defeated by Charles at Tagliacozzo, and beheaded in the market-place at Naples, with the approbation of Clement, as it was reported. A month after Conradin's execution, Clement himself died, in November, 1268. His death was followed by an interregnum of about two years, after which the Cardinals at last elected Gregory X.

CLEMENT V., a Frenchman, and archbishop of Bordeaux, succeeded Benedict XI. in 1305, by the influence of Philip le Bel, who induced him to remove the papal residence to France. Clement joined Philip in suppressing the order of the Templars, and in condemning the grand master and sixty knights to be burnt alive. Clement died in April, 1314, and was succeeded, after two years interregnum, by John XXII. [CLEMENTINES.]

CLEMENT VI., a Frenchman, succeeded Benedict XII. in 1342. He resided at Avignon like his immediate predecessors, and it was under his pontificate that Rienzi made the attempt to re-establish the republic at Rome. [RIENZI.] Clement took the part of Joanna I., queen of Naples, against her brother-in-law, Lewis of Hungary, who had invaded her dominions to avenge the murder of her husband. Joanna, on her part, sold or gave away to the papal see the town and county of Avignon, which belonged to her as sovereign of Provence. Clement fixed the jubilee to be held at Rome every fifty years. He died in 1352, and was succeeded by Innocent VI.

CLEMENT VII., Giulio de' Medici, the natural son of Giuliano de' Medici, and nephew to Lorenzo the Magnificent, was made cardinal by his cousin, Leo X., and was afterwards promoted, in 1523, to the papal chair, then vacant by the death of Adrian VI. His pontificate was full of vicissitudes and calamities to Italy. He first allied himself with Francis I. against Charles V., in order to prevent the latter possessing himself of all Italy; but he only hastened the progress of the imperial arms, and saw his own capital, Rome, stormed and cruelly pillaged by the army of Charles, and himself besieged in the Castle Sant' Angelo. He afterwards made peace with the emperor, and united with him to destroy the independence of Florence, his native country. Clement's quarrel with Henry VIII. of England, which arose from his refusing the bull of divorce between that king and Catharine of Aragon, led to the schism between Henry and Rome. He died in 1534 after a long illness, leaving behind him a character stained by avarice, harshness, and deception; he had most of the failings, but none of the splendid or amiable qualities, of his cousin, Leo X. He was succeeded by Paul III.

There was also an antipope in the fourteenth century, who was elected by a party among the cardinals in opposition to Urban VI., and who assumed the name of Clement VII. The schism lasted many years, and was continued by the respective successors of Urban and of Clement till the Council of Constance decided the question. The Roman calendar acknowledges Urban and his successors as legitimate popes, and places Clement among the antipopes. [URBAN VI. and BENEDICT ANTIPOPE.]

CLEMENT VIII., Ippolito Aldobrandini, succeeded Innocent IX. in 1592. He was a man of learning, and of considerable political sagacity. He succeeded in the negotiations with Henry IV. of France, by which that prince made public profession of Catholicism, and was acknowledged king by his subjects. Clement annexed, by force, the duchy of Ferrara to the papal state after the death of Duke Alfonso II., disregarding the claims of the Duke's cousin, Cesare d'Este, who was obliged to yield, and retire to Modena. Clement died in February, 1605, and was succeeded by Leo XI. He published a new edition of the Vulgate, differing in some particulars from that published under Sixtus V., in 1590. He also issued many bulls, the most remarkable of which are the 28th, defining the lawful and unlawful rites and usages of the Greek church, and the 87th, concerning the practice of confession and absolution in writing.

CLEMENT IX., Giulio Rospigliosi, of a noble family of Pistoia, succeeded Alexander VII. in June, 1667. He showed a wise conciliatory spirit, hushed for awhile the controversy between the Jansenists and the Jesuits [ARNAULD], and settled the long-pending dispute between the see of Rome and the king of Portugal, on the right of nomination to the vacant bishoprics, by confirming the prelates appointed by King Pedro II. He took a warm interest in the war between Venice and the Turks, and sent assistance of men and money to the Venetians for the defence of Dalmatia and of Candia. The news of the loss of that island, which was finally conquered by the Turks in 1669, is said to have hastened the death of Clement, which occurred in December of that year. He was much regretted by his subjects as well as by foreign princes. He embellished Rome, and was magnificent in his expenditure. His nephew was made a Roman prince, and married the heiress of the house of Pallavicini, of Genoa. Clement IX. was succeeded by

CLEMENT X., Emilio Altieri, who was 80 years of age at the time of his election, in 1670. He intrusted the affairs of the administration chiefly to Cardinal Paluzzi, a distant relative, whom he adopted as his nephew, and gave him his family name of Altieri, as he had no nearer relations living. He died in 1676, and was succeeded by Innocent XI.

CLEMENT XI., Gian Francesco Albani, succeeded Innocent XII. in November, 1700. He was then fifty-one years of age, had been made a cardinal by Alexander VIII., and had a merited reputation for learning and general information. He was one of the men of letters who frequented the society of Christina of Sweden during her residence at Rome. It was with seeming repugnance, and after several days' hesitation, that he accepted the papal

dignity. The war of the Spanish succession was then just breaking out, and Clement in vain exerted all his powers of persuasion with the courts of France and of Austria to prevent the impending calamity. Louis XIV. having placed his grandson Philip on the throne of Spain, demanded for him of the pope the investiture of the kingdoms of Naples and Sicily, whilst the emperor claimed it likewise as his right. Clement delayed giving his decision, and the intrigues of the agents of the two rival powers disturbed the peace of his own capital. In 1707 the Austrians, under Marshal Daun, traversed the papal state to proceed to the conquest of Naples; and the pope, unable to prevent them, stipulated only that they should not pass through the city of Rome. In the following year the pope came to an open rupture with the emperor, Joseph I., whose troops had taken possession of Comacchio in the papal state. After trying remonstrances in vain, Clement collected an army of 25,000 men, under the command of Count Marsigli; but the papal troops retreated before the Austrians, who occupied Romagna and the Marches, and the pope was obliged to sue for peace, which the emperor readily granted in January, 1709. Comacchio was ultimately restored to the pope.

About the same time a large volume was written by Clement's directions, concerning the claims of the see of Rome upon the duchies of Parma and Piacenza, which the emperor considered as feudatory to the empire, and had accordingly stopped the remittances to Rome of the fees and revenues claimed by the papal see from the ecclesiastical benefices in Lombardy, and other countries subject to the House of Austria. Clement was tenacious of what he considered as the prerogatives of his see over the clergy of other countries, and he quarrelled in 1715 with the House of Savoy, which then ruled over Sicily, about a tribunal in that island, called di Monarchia, which interfered with the ecclesiastical immunities and the alleged rights of Rome over Naples and Sicily, as fiefs of the papal see. The king, Victor Amadeus II., stood firm; and many of the Sicilian clergy, who refused to obey the directions of the tribunal, were either imprisoned or obliged to emigrate. About four hundred of the latter took refuge at Rome. Clement had also long and serious disputes with France. He began by his bull 'Vineam Domini,' renewing the interdict which his predecessors had issued against the Jansenists, and declaring their propositions about grace and free will to be heretical. In 1713 he issued the famous bull 'Unigenitus,' which set the whole kingdom of France, court, parliament, and clergy, in an uproar. This bull condemned 101 propositions of a book by Father Quesnel, entitled 'Moral Reflections on the New Testament;' in which that writer revived several opinions of St. Augustin, St. Prosper, and other old fathers, which sounded favourable to the Jansenistic dogmas of predestination and grace. The Jesuits, who asserted that grace was subordinate to the will of man, and who were accused by the Jansenists of Pelagian heresy, stirred themselves to have Quesnel's book condemned. Several French prelates, Bossuet and Cardinal Noailles among others, approved of the general tenor of Quesnel's book, which contains much sound moral doctrine. Cardinal Noailles had already indisposed the pope against him by presiding at an assembly of the French clergy in 1705, in which the bishops were declared to be judges in matters of doctrine, independent of the pretensions of the popes, who would reduce them to the condition of mere registrars and executors of the papal decrees. Father le Tellier, a Jesuit and confessor to Louis XIV., urged the king in favour of the bull 'Unigenitus,' which was at last registered by the parliament of Paris, after much opposition, and continued for years after to keep up a sort of schism between France and Rome. Father Quesnel, the involuntary cause of all this disturbance, died in December, 1719, at Amsterdam, where he had taken refuge. In a declaration which he signed before a notary he professed that he died in the bosom of the Roman Catholic church, appealing to a future council against the bull 'Unigenitus.'

Another source of tribulation to Clement proceeded from the disputes concerning the Jesuit missionaries in China, who had gained considerable influence at the court of Pekin, and were accused by the other missionaries of latitudinarianism, of winking at several superstitious practices in order to make proselytes, and of even countenancing idolatry. Clement sent, in 1702, Cardinal de Tournon as legate to China; but the cardinal on arriving at Macao was so worried by the angry controversialists that he died of anxiety and disappointment, and the quarrel between the missionaries continued to rage more furiously than ever, to the great scandal of the Chinese. Clement at last issued a constitution, or series of ordinances, by which he regulated the course to be followed by missionaries in making proselytes: it was sent in a circular to the superiors of the different monastic orders who had missionaries in China. As the quarrel however continued to rage in China, Clement sent the prelate Mezzabarba as his legate. Mezzabarba went to Pekin, where he was coldly received by the emperor, who was said to be prepossessed against him by the Jesuits, and the legate was soon dismissed from the celestial empire.

Clement took a warm interest in the expedition of the Pretender, son of James II., in 1715, and furnished him with money. After the failure of that attempt, the Pretender, being forsaken by France, retired to Italy under the name of the Chevalier de St. George, and Clement appointed the town of Urbino for his residence. He afterwards negotiated his marriage with Clementina Sobieski, which was celebrated at Monte Fiascone, at the pope's expense, who gave to the married couple a palace at Rome to reside in, with an annual pension of 12,000 crowns. The court of Rome did not for a long time after give up its favourite scheme of regaining England to Catholicism, by means of the Stuarts.

Clement was more profitably employed in frustrating the schemes of the Turks, who, having invaded the island of Corfu in 1716, were threatening Italy with an invasion. The pope sent a squadron to join the Venetians, he levied a contribution upon the clergy of all Italy to defray the expense of the war, and he prevailed on the emperor, Charles VI., to join Venice against the Porte. This led to the brilliant campaign of Prince Eugene, who defeated the Turks at Peterwaradin, and took Temeswar. The Turks were also obliged to raise the siege of Corfu.

After the fall of the intriguing Alberoni, in 1719, Clement succeeded in settling his disputes with Philip V. of Spain, and his Nunzio was again received at Madrid. Europe was now at peace, and Clement enjoyed a short period of rest, after a long series of agitations, until March, 1721, when he died, after a pontificate of more than twenty years. In his private character he was amiable and generous, and his morals were irreproachable. He was very moderate in providing for his nephews, who owed their elevation more to his successors than to himself. He embellished Rome, and established the Calcografia Camerale, which has since given to the world many splendid engravings; he encouraged the art of mosaic, and he introduced at Rome the manufactory of tapestry, on the model of the Gobelins. He added to the Vatican library, and to the museum which is annexed to it. Grateful to the memory of his early patroness, Christina of Sweden, he raised to her a monument in St. Peter's. He patronised men of letters and of science, was the friend of Guidi, Menzini, Sergardi, Marsigli, Martelli, Zappi, and the learned Bianchini. A fine edition of his decretals, bulls, and constitutions, was published by his nephew, Cardinal Annibale Albani, after his death, 'Bullarium Clementis XI.,' one vol., fol. He wrote also several Latin homilies, which he recited on solemn festivals, and which were translated into Italian by Crescimbeni.

CLEMENT XII., Lorenzo Corsini, of Florence, succeeded Benedict, in July, 1730. He was then seventy-nine years of age, and infirm. He resumed the old contest with the empire about the reversion of the duchies of Parma and Piacenza, but succeeded no better than his predecessors. He endeavoured, and also in vain, to mediate in the war between the republic of Genoa and the Corsicans. He succeeded better in restoring, in 1740, the little republic of San Marino to its liberties, which had been encroached upon by Cardinal Alberoni. He died soon after, in 1740, and was succeeded by Benedict XIV.

CLEMENT XIII., Carlo Rezzonico, a native of Venice, succeeded Benedict XIV. in July, 1758. He was more distinguished for his piety and private virtues, than for political abilities or knowledge of the world. His pontificate was a continual, but on his part ineffectual, struggle to uphold the ecclesiastical immunities and the old prerogatives of the see of Rome against the determination of the other powers to be complete masters in their respective countries. He strove hard to support the Jesuits, who had become obnoxious to various courts, and who were suddenly suppressed in Portugal, Spain, France, and Naples. In their

distress, most of the expelled fathers sought an asylum in the Papal States, and found in Clement a generous protector. All the remonstrances and threats of France and Spain could not induce him to abolish the Order, which he considered as the firmest support of the Roman see. The king of France seized upon Avignon, and the king of Naples upon Benevento; still the pope held firm till his death. The Venetian senate, by a series of decrees passed in September, 1768, enforced numerous reforms in ecclesiastical discipline in their own dominions, subjected the clergy to the payment of tithes, suppressed some convents, placed the rest under restrictions with regard to their property and the number of their inmates, and subjected all ecclesiastics to the jurisdiction of the secular courts in temporal matters. Clement strongly remonstrated against these innovations: he threatened excommunication, but the senate persisted in its resolutions. He also came to a rupture with the republic of Genoa, because he had sent an apostolic vicar into Corsica, which was then in a state of revolt against the Genoese. The elector of Bavaria, about the same time, declared that none but his own subjects should hold benefices within his dominions. Maria Theresa made similar enactments in her own states, and she took away the censorship of books from the ecclesiastical authorities, and gave it to the secular magistrates. Tuscany, Parma, and Naples suppressed convents, and checked the practice of donations and legacies to the church. In the midst of all these blows against the papal authority, Clement died in February, 1769. A splendid mausoleum was raised to him by Pius VI. in St. Peter's church, which is much admired, especially for its statue of the pope kneeling at prayers, and the two lions couching at the foot of the monument. It was one of the earlier, and among the best, works of Canova, who was employed eight years upon it. It was finished and exposed to public view in the holy week of 1795.

CLEMENT XIV., Gian Vincenzo Ganganelli, was born at Sant' Angelo in Vado, near Rimini, in 1705. At an early age he entered the order of Franciscans, distinguished himself by his learning, was favourably noticed and employed by Benedict XIV., and was made a cardinal by Clement XIII., whom he succeeded in May, 1769, after a stormy conclave, which lasted two months. He adopted a conciliating tone towards the foreign powers, which at the death of his predecessor were on the eve of an open rupture with Rome. He discontinued the public reading of the bull in Cœna Domini, which was considered offensive to the sovereigns. The great question which at that time agitated the Roman Catholic world was the definitive abolition of the order of the Jesuits. Ganganelli took several years to decide on this important subject, and at last, on the 21st July, 1773, he issued the bull of suppression. But the manner in which that suppression was executed in the papal state partook of unnecessary rigour and harshness. Soon after this step, Clement, overcome by labour and anxiety, began to decline in health. About Easter, 1774, he was taken dangerously ill, under suspicious symptoms; he lingered a few months, and died 22nd September, 1774. Rumours were spread that he had died of poison, but the post mortem examination of his body and the report of the physicians did not countenance the suspicion. Ganganelli was a man of enlightened mind; perhaps too much so for the taste of the more violent zealots about the court of Rome. He had a taste for the arts; he continued the collection of antique sculptures begun by Lambertini, and ranged them in a suite of rooms in the Vatican, which was called the Clementine museum, and was afterwards greatly enlarged by his successor, Pius VI., when it received the name of Museo Pio-Clementino. He added also to the Vatican library. A fine monument, the work of Canova, was raised to him in the church of S. Apostoli, which belonged to a convent of his order. The letters published by Caraccioli under the name of Ganganelli are now generally understood to be apocryphal; although the writer has traced pretty faithfully the character and many of the sentiments of that distinguished pontiff. Ganganelli was simple in his habits, free from ambition, and not given to nepotism.

CLEMENTI, MU'ZIO, who is justly entitled to rank as the father of the piano-forte school, both as regards composition and performance, was born, in 1752, at Rome, where his father practised as an embosser of silver figures and vases for the service of the church. At nine years of age he had made so much progress in music under Cordicelli, that he passed a close examination, and was appointed to an organist's place in his native city. He afterwards studied under Santarelli and Carpani, and wrote a mass for four voices when in his thirteenth year. About that time his talents attracted the notice of Mr. Peter Beckford, an English gentleman, then travelling in Italy, who undertook the future education of the young artist, and brought him to his seat in Dorsetshire, where the society of a literary and accomplished family inspired him with that taste for the belles-lettres which encouraged him to pursue a course of study that had been well commenced under a member of the Society of Jesus, and to acquire an extensive knowledge of the learned and living languages, as well as of various branches of science. But he did not neglect the art which he had chosen as his profession, for before he had completed his eighteenth year he composed his celebrated Opera 2: 'a work which, in the opinion of all good musicians, is the basis on which the whole fabric of modern piano-forte sonatas has been founded.'

At the time agreed on by his father, Clementi quitted Mr. Beckford. He shortly after was engaged to preside at the harpsichord at the King's Theatre, and soon was actively and lucratively employed as a master of the first rank. In 1780 he made a tour on the continent, whither his fame had long preceded him, and enjoyed everywhere the highest patronage and the most flattering applause. In Vienna he made the acquaintance of Haydn, Mozart, &c., and played alternately with the latter before the Emperor Joseph II. and other royal personages. While in Paris he wrote his Operas 5 and 6; and in Vienna his Operas 7, 8, 9 and 10 were composed. On his return to England he published his Opera 11, and Toccata, as well as his Opera 12. In 1783, J. B. Cramer, who had previously studied under Abel and Schrœter, became his pupil, and attended him almost daily.

About the year 1800, having suffered considerably by the failure of the house of Longman and Broderip, he was, by the advice of some eminent mercantile friends, induced to take possession of the premises of those partners, to embark in the music-publishing and piano-forte manufacturing business, and become the head of a new firm, from which time he declined all pupils, and devoted himself wholly to his new, important, and successful occupation. But the peace of 1802 tempted him abroad again, and, accompanied by his pupil, Field, he proceeded from city to city till he reached St. Petersburg, where he made some stay. In Berlin he married, and with his bride proceeded to Rome and Naples. He shortly after lost his wife, in childbed of a son, who grew up to be his father's pride and solace, but unhappily lost his life by the accidental discharge of his own pistol. In 1810 Mr. Clementi, after encountering many difficulties in his attempts to reach England during the fiercest period of the renewed war, arrived in London, and shortly after entered again into the married state. During his last visit to the continent he published his Opera 41, and collected materials for many other works, which subsequently appeared, among which his *Practical Harmony* in four volumes, and his *Gradus ad Parnassum*, in three, must not be left unnoticed.

In 1813 Mr. Clementi assisted in founding the Philharmonic Society, of which he frequently consented to act as a director, and presented to it his two symphonies, which were more than once performed by that admirable band, and received with every mark of respect. They both abound in agreeable melody, and are most skilfully written; but the real vigour of the composer's genius is exhibited in his piano-forte works, which will be revived or laid aside as true taste shall happen to be in the ascendant or on the decline.

After an illness of no long duration, Mr. Clementi died on the 10th of March, 1832. His remains were deposited in the cloisters of Westminster Abbey, and attended to the grave by the choir of that church, of the King's chapel, and of St. Paul's, together with numerous friends. In the *Harmonicon* for April, 1832, is a just eulogy of this very celebrated composer, by a brother-member of the Philharmonic Society, who thus speaks of him:—'He was honourable in his intercourse with the world, affectionate and attentive to his family, constant in his friendships, and benevolent in his feelings towards the whole human race.'

CLEMENTINES, is the name given to a collection of

decretals and constitutions of Pope Clement V., which was published in 1308 under the title of 'Liber septimus Decretalium,' being the seventh book in order of time of the collection of the decisions and rescripts of the popes on matters of ecclesiastical discipline, and also on matters concerning laymen which then came within the cognizance of the ecclesiastical courts. [CANON LAW.] The first printed editions of the Clementines are those of Mainz, 1460 and 1467, fol., which are very scarce.

CLEODO'RA. [HYALÆIDÆ.]

CLEO'MBROTUS I., brother of Agesipolis, succeeded him as king of Sparta. In 378 B.C. he marched with an army into Bœotia to attack the Thebans. Passing into the Theban territory he encamped at Cynoscephalæ, and, after remaining there sixteen days, withdrew to Thespiæ. The purpose of the expedition not requiring his presence longer, he left a third of his forces under Sphodrias, and led back the rest to the Peloponnesus. Two years afterwards, 376 B.C., in consequence of the severe illness of Agesilaus, he was chosen to lead another army against the Thebans. In 371 B.C. he commanded, in the celebrated battle at Leuctra, against Epaminondas. The Lacedæmonian horse were quickly routed and were immediately charged by the Theban phalanx. Cleombrotus was mortally wounded in the attack, and died soon after. (Xenophon, *Hellen.* v. 4, vi. 4.)

CLEOMBROTUS II., son-in-law of Leonidas, was elected king of Sparta on the expulsion of Leonidas. (Pausanias iii. 6; Clinton, *Fast. Hel.*, p. 217.)

CLEOME'DES, a Greek writer on astronomy. There is some doubt about the age in which he lived; or, which is the same thing, whether the manuscripts remaining which bear the name of Cleomedes were all written by one man, or by two men at different times. The manuscripts which remain are on astronomy, on the doctrine of the sphere, and on arithmetic. Vossius conjectures that the work on music attributed to Cleonidas belongs to Cleomedes. Riccioli seems to have been one of the first who supposed that there were two of this name, one about the time of Augustus, the other in the reign of Theodosius. The work on astronomy was attributed by Vossius to the latter; but the principal arguments against so late an author lie in his frequent mention of Pythagoras, Eratosthenes, Hipparchus, and Posidonius, and his entire silence about Ptolemy. See however the arguments of Letronne, *Journal des Savans*, 1821, p. 713.

We mean by Cleomedes the one of that name who wrote the work Περὶ κυκλικῆς θεωρίας μετεώρων, in two books, On the Circular Theory of the Heavenly Bodies. It is professedly in several parts taken from a writing, or from the public lectures, of Posidonius, who was certainly the contemporary of Cicero. It is a probable conjecture that Cleomedes was a pupil of Posidonius. The work in question has considerable historical value it records the measures of the earth by Posidonius and Eratosthenes, establishes the antiquity of the opinion that the rotation of the moon is equal to her synodical revolution round the earth;—had it been the sidereal revolution, it would have been correct. It gives various arguments in proof of the rotundity of the earth, in opposition to the supposition of flat and cubical forms, &c., and from this source the early English writers drew much of what they said on the same subject. It mentions eclipses as having happened without having been predicted in the 'canons;' a proof that something answering to an almanac was in common use. It decidedly suggests the possibility of rays of light being bent by the air. Delambre has made it sufficiently apparent that Cleomedes was not acquainted with the writings of Hipparchus, though he frequently cites opinions and methods which he attributes to him.

The earlier editions of Cleomedes are, 1. The Latin version of George Valla, Venice, 1497 or 1498. 2. In Latin, with Aristotle and Philo, Basle, 1533. 3. The first Greek edition, by Conrad Neobarius, Paris, 1539. 4. In Greek and Latin with Aratus, Proclus, and Dionysius, Basle, 1547; again in 1561; again in 1585. 5. In Greek and Latin, with a Commentary, by George Balfour, Bordeaux, 4to., 1605. This edition was re-published with additional notes, by Janus Bake, Leipzig, 1820; this also was re-published, with additional notes, by C. C. Theoph. Schmidt, Leipzig, 1831. The most esteemed manuscript is that in the public library at Wittenberg. (Riccioli, Vossius, Weidler, Heilbronner, Delambre, *Hist. Astr. Anc.* i. 218.)

CLEO'MENES, the name of several kings of Sparta. Cleomenes I., son of Anaxandrides (Herod. v. 39), although not perfectly sane, succeeded his father. (Herod. v. 42.) He expelled the Peisistratidæ from Athens (Herod. v. 63, 64), 510 B.C., and espoused the cause of Isagoras in opposition to Cleisthenes [CLEISTHENES], who, however, with the seven hundred families that had been banished, after wards returned and forced him to leave the city. Demaratus, the colleague of Cleomenes, accused him of favouring the Medes, while on an expedition against the Æginetæ, and obliged him to return home. By the aid of Leotychides, a private enemy of Demaratus, and by bribery of the Delphic oracle, Cleomenes succeeded in effecting the abdication of Demaratus. (Herod. vi., 65, 66.) In a war against the people of Argos (about 491 B.C., Clinton, *Fast. Hel.*, p. 425, *note* x.), Cleomenes was completely victorious, and burnt a great number of the fugitives in a sacred grove where they had taken refuge. (Herod. vi., 80.) The means by which he had contrived to get rid of Demaratus afterwards becoming known, he was banished into Thessaly and subsequently to Arcadia, where he endeavoured to stir up the people against the Lacedæmonians. (Herod. vi, 74.) He was ordered to return, and on his arrival in Sparta he confirmed the belief of his madness by mortally wounding himself (Herod. vi., 75), 492 B.C.

CLEO'MENES II. succeeded his brother Agesipolis II. (Diodor. Sic. xv., 60), 309 B.C., and reigned 61 years: he died 370 B.C. (Clinton, *Fast. Hel.*, pp. 205, 213).

CLEO'MENES III. succeeded his father Leonidas on the throne of Sparta B. C. 236. Immediately on his accession he set himself to oppose Aratus and the Achæans, who were endeavouring to draw all the Peloponnesians into their league. [ACHÆI.] The Ephori were averse to the war, and Cleomenes saw no way to attain his ends but by abolishing their power. Accordingly he put four of them to death, and attempted to excuse this act of violence by showing the necessity of restoring the antient institutions of Lycurgus, which could not be effected by any other means. He renewed the old Spartan system of education, and himself observed great simplicity in his mode of life. His colleague of the house of Proclus, an infant, whose name was Eurydamidas, he also removed out of the way by poison, and shared the kingly power with his own brother Eucleidas (Pausanias, 2, 9). He also abolished the Gerusia (γερουσία), or senate, and transferred their powers to another body (patrónomi) apparently of his own creating; but this rests solely on the authority of Pausanias. Cleomenes, in his invasion of Achæa, took several cities, and soon afterwards attacked Argos. In order more effectually to oppose Aratus, who had obtained the assistance of Antigonus, Cleomenes formed an alliance with Ptolemy, king of Egypt. The contending parties fought a decisive battle at Sellasia, in Laconica, in which the Lacedæmonians were completely defeated: of 6000 men only 200 survived. After the battle Cleomenes fled to Egypt, where he was hospitably entertained by Ptolemy Evergetes. His son and successor however, Ptolemy Philopator, soon showed considerable jealousy of the royal guest, and accordingly put him in confinement. Cleomenes killed himself in the third year after his flight, and his body was afterwards nailed upon a cross by Ptolemy Philopator, B. C. 220 (Clinton, *F. H.*, p. 205). He reigned sixteen years. (Plutarch, *Cleom.*, c. 38.) Livy (xxxiv. 26), following Polybius (iv.), represents Cleomenes as a tyrant; but Polybius was a native of a city (Megalopolis) which Cleomenes had destroyed, and the support of the Achæan league was a family concern. The truth appears to be, that the great object of Cleomenes was to revive the antient discipline and institutions of Lycurgus, and to put an end to the luxury and corruption which had crept into the state. If the means which he took were sometimes indefensible, it may perhaps be said in reply that his ends were good, and that such means were not entirely condemned by the positive morality of his age and country. (Polybius, ii. iv. and v.; Plutarch, *Life of Cleomenes.*)

CLEON, of Athens, the son of Cleaenetus, was originally a tanner. Early in life he began to take an active part in the political affairs of Athens, and his success seems to have drawn him from his business. He set himself up as the champion of the people, and was especially vehement in their cause, when their interests appeared to be opposed to those of the rich. The first affair in which he took a prominent part was the discussion on the massacre of the Mitylenæan prisoners, 427 B.C., who were sent to Athens after the reduction of the island by Paches. Such was the influence of Cleon on this occasion that he succeeded in persuading the assembly to pass a decree, by which all the Mitylenæan

prisoners sent to Athens by Paches, and every citizen in Mitylene, should be put to death, and the women and children made slaves. The prisoners, who had been sent to Athens, were massacred the same day to the number of more than one thousand; but the timely remorse of the Athenians prevented the execution of the remainder of the sentence. In an assembly called on the following day to reconsider the decree, Cleon came forward to support it with the utmost vehemence, and the majority of his opponent Diodotus was very small.

In 425 B.C., the Athenians built a small fort at Pylos, in Messenia, under the direction of their general, Demosthenes. The Lacedæmonians, with the view of destroying a post that would prove a great annoyance to them, made preparations to besiege it, and also threw a body of men into the small island of Sphacteria, which lay at the entrance of the harbour of Pylos. The island was immediately blockaded by the Athenians; but as there seemed no prospect of its being speedily taken, the Athenians at home began to complain, and Cleon accused the generals of want of activity in pressing the blockade. 'If he were in command,' he said, 'he would soon finish the business.' The people took him at his word; Nicias, one of the commanders at Pylos, insisted that Cleon should supersede him, and the demagogue, much against his will, was obliged to accept the command. However, he put the best face on the matter, and said that he would be back at Athens in twenty days, and would either bring with him all the Lacedæmonians in the island prisoners, or he would not leave a man of them alive. He took Demosthenes as his colleague in the expedition. He was as good as his word, and brought the Lacedæmonians prisoners to Athens within the twenty days. Thucydides, who rarely indulges in reflections on the character of persons in the body of his history, could not abstain from a side-blow at this odious demagogue. The most sensible among the Athenians, he observes, were rather pleased at Cleon's being intrusted with the affair of Pylos, for they thought that the result in any event could not be otherwise than good: they would either get rid of Cleon for ever, which they rather expected, or, if they were disappointed in this, he would probably take the place.

Whether any of the merit of this exploit belonged to Cleon seems more than doubtful. (Aristoph. *Equ.* 54, &c.) His prudence in the selection of his colleague cannot be questioned. The reputation which he gained for energy and promptitude in this affair, added to his inordinate vanity, completely turned his head, and it would seem by what followed as if many of his countrymen were so far deceived by this lucky business of Pylos as to think that Cleon actually had the talents that he pretended to. Accordingly, in 422 B.C. this incapable babbler was fixed upon as the proper person to oppose the movements of the able Spartan general Brasidas in Macedonia and Thrace, and he received the undivided command of 1200 heavy-armed men and 300 horse, with still larger forces of Imbrians and Lemnians, and a fleet of 30 galleys. He did not march direct to Amphipolis, which was the principal object of the expedition, but stopped in his way to recover Torone. Brasidas, who had left the town, had stationed there a garrison which was inadequate for its defence, and accordingly Cleon was successful in his attack on the place. He sold all the women and children as slaves, and sent more than 700 men as prisoners to Athens. Proceeding with increased confidence in his own military powers, he stationed himself at Eion on the Strymon, and delayed the attack on Amphipolis till he had received reinforcements. During this interval he made a fruitless attempt on Stagirus, but succeeded in his attack on Galepsus. The murmurs of his soldiers, who from the first had not been pleased with Cleon's being appointed to the command, soon induced him to move towards Amphipolis with a view of reconnoitring, but not of fighting. Brasidas, however, who was in Amphipolis, did not choose to let him off so easily: he made a sudden sally out of the place, while Cleon, who was quite unprepared for an attack, and had not the least intention to fight, was giving orders for a retreat. In the battle that ensued both the Lacedæmonian and the Athenian generals fell B.C. 422. Cleon, says Thucydides (with a half malicious coolness), who had never had any idea of keeping his ground from the first, was caught as he ran away, and killed by a Myrcinian targeteer. The remains of the Athenian army returned home.

If Cleon possessed any qualifications at all as a statesman, they consisted not in superiority of talent or in political knowledge (for he had little of either), but in a singular facility of speaking and a great command of words, which, combined with low manners, unsparing abuse of those who were better than himself, and a coarse vehement mode of delivery, rendered him acceptable to the mob. Whatever influence he gained with the more considerate citizens seems to have arisen from the reputation which he gained for blunt honesty in the declaration of his sentiments, and a general promptness in action. The real qualities which he contrived to get so favourably interpreted appear to have been impudence and rashness. The indignation of the comic poet (Aristophanes) was at last roused to endeavour to suppress what seemed to defy all other opposition. Aristophanes levelled at Cleon the shafts of his satire, and held him up to public ridicule in the most ridiculous colours. On one occasion (in the *Acharnenses*), alluding to the demagogue's former occupation, he threatens to 'cut him into shoe-leather,' and the comedy of 'the Knights' (Ἱππῆς) was composed with the express object of destroying his authority, which had been raised to so extraordinary a pitch by his success in the affair of Pylos. The victory at Sphacteria took place 425 B.C., and 'the Knights' was represented 424 B.C. Such was the dread of offending Cleon, that not an actor was to be found bold enough to personate him on the stage, while the mask-maker refused to give a representation of his face, and Aristophanes was obliged to act in that character himself, supplying the want of a mask by smearing his face with the lees of wine. [BRASIDAS; ARISTOPHANES.] (Thucyd. iii., 36; iv., 21-40, &c.; v., 2-10; Aristoph., *Equites;* Thirlwall's *Greece*, vol. iii., pp. 185-192, 244-251, 300-304.)

CLEO'NUS, a genus of Coleopterous insects, of the section Rhyncophora, and family Curculionidæ.*

Technical characters:—antennæ rather short, the scape not touching the eyes; basal joint of the funiculus nearly obconic, and rather longer than the remaining joints; the joints from the second to the sixth short and coarctate, the seventh stouter, and closely applied to the club, which is oblong-ovate or nearly so; rostrum short and thick, having generally a channel above; eyes oblong and depressed; thorax subconic, slightly constricted anteriorly; elytra elongate, generally furnished with a protuberance near the apex, which is rounded; legs nearly equal; femora unarmed; tibiæ with the apex slightly thickened, and furnished with a short spine.

Of the genus Cleonus about a hundred species are known; they inhabit Europe, Asia, and Africa. The ground colour of their body is almost always black, but this is for the most part hidden by the denseness of the little scales with which they are covered. These scales are generally of an ash-like colour, grey, white, or pale-brown, and small patches of two or more of these tints form clouded markings. Dark markings are often produced by the want of these scales on certain parts, the ground colour of the body then showing itself.

Cleonus sulcirostris is given as the type of this genus. We will therefore describe it. It is about two-thirds of an inch in length, of an elongate oval form, and of an ashy or white colour; the rostrum is thick, nearly as long as the thorax, and furnished with three deep longitudinal furrows; the thorax is almost as wide as the elytra at the base, and tapers towards the head; there is a longitudinal pale line in the centre, which is bordered by two broad dark brown patches; the rest of the thorax is pale, with the exception of a small brown patch on each side; the elytra are of an ashy colour, and have two oblique V-shaped fasciæ near the middle.

This insect is common in various parts of England, and seems more particularly to frequent chalky and sandy situations; it is sometimes found on nettles and thistles, and often crawling on barren sand-hills near the sea-side. Three or four other species are also found in this country. *Cleonus nebulosus* is very common in some parts of Hampshire, and nearly resembles the one above described, but may be at once distinguished by the absence of the sulci on the snout or rostrum: the scales in this species are not unfrequently red.

CLEOPA'TRA (Κλεοπάτρα), a daughter of Ptolemy

* Among the various modes of dividing the immense group of insects called Rhyncophora by Latreille, Curculionides by Schonherr, and Curculionidæ by Leach, it is difficult to choose which to adopt. It is necessary to state, that the term Curculionidæ is here restricted to that group of the Rhyncophora included under the head Curculio proper by Latreille.

Auletes, king of Egypt, was born about B.C. 69 Her father, who died B.C. 51, left two sons called Ptolemy, besides Cleopatra and her sister Arsinoe. By her father's will Cleopatra and her elder brother were to be joint sovereigns, but they soon disagreed, and Cleopatra was obliged to take refuge in Syria. In B.C. 48, Julius Cæsar arriving in Egypt in pursuit of Pompey, who had fled from the battle of Pharsalia, determined to carry the will of Ptolemy into effect, and to settle the dispute between Cleopatra and her brother. The youthful queen, who probably knew the character of the Dictator, contrived to get herself privately conveyed into his presence, and by her fascinating manners completely gained his favour. Though not remarkable for beauty, according to the testimony of antient writers, which is confirmed by her medals, she possessed great natural abilities, which had been carefully cultivated. She is said to have spoken with facility several languages, besides her native Greek; a circumstance in itself well calculated to give an artful woman a great ascendency over all with whom she came in contact. Cæsar decided that Cleopatra should be restored to her equal share of power. This decision giving dissatisfaction to the young prince and his advisers, led to an attack upon Cæsar's quarters under Achillas, the commander of the king's troops. After a blockade of some months Cæsar received reinforcements, and completely defeated the party of the king, who was drowned in the Nile. The sovereign power was now given by Cæsar, in conformity with the meaning of Ptolemy's will, to Cleopatra and her younger brother Ptolemy. On Cæsar's return to Rome, Cleopatra shortly after followed him, and remained there till his assassination (B.C. 44), when she hastily quitted the city and returned to Egypt. (Cic. *Ep. ad Att.* xiv. 8.)

In the fourth year of their joint reign Cleopatra murdered her brother Ptolemy. Her connexion with Marc Antony commenced after the battle of Philippi, about B.C. 40, with the interview at Tarsus in Cilicia, of which Plutarch (*Anton.* 25—27) has given a minute description, and which Shakspeare, in his play of 'Antony and Cleopatra,' has turned into a glowing picture. Antony had no doubt seen Cleopatra during her residence at Rome, but, according to Appian, he was first struck with her charms in Egypt (B.C. 55) when he accompanied Gabinius, who was commissioned to restore Ptolemy Auletes to his throne. Cleopatra at this their first interview was only in her fifteenth year. From the time of the meeting at Tarsus the destinies of Antony and Cleopatra were united. The voluptuous queen, whose love of pleasure was unbounded, found in Antony a companion to her taste; and she spared no pains to attract him by all the allurements that her inventive talents could devise. Her influence over him seems to have continued undiminished to the end of his life.

If we may believe the extant authorities, Antony was even prevailed upon by Cleopatra to order her sister Arsinoe to be put to death, who had taken sanctuary in the temple of Diana at Ephesus.

The return of Antony to Italy, and his marriage with Octavia, the half-sister of Octavianus, for a time separated him from the queen of Egypt; but they met again in Syria (B.C. 36) previous to the unsuccessful Parthian expedition of that year, after which Antony renounced his wife for the charms of Cleopatra. Cleopatra was present at the decisive battle of Actium, and set the example of flight, which was followed by Antony. On the death of Antony Cleopatra committed suicide in order to avoid the humiliation of being led in the triumphal procession of Octavianus. Most probably she took poison. According to the story in Plutarch, she was closely watched by the orders of Octavianus, who suspected her designs, but she procured a poisonous serpent to be introduced in a basket of figs. The queen, after using the bath, and partaking of a sumptuous repast, applied the deadly serpent to her arm. Two of her female attendants died with her. The emissaries of Augustus, who had received a letter from Cleopatra declaring her intention, came too late to save her for a Roman triumph. They found her body lying on a golden couch in her royal robes, with one of her attendants dead by her side, and the other with just strength enough remaining to fix the diadem on the head of her mistress. Cleopatra at the time of her death was in her thirty-ninth year. She was buried by order of Octavianus with royal honours in the same tomb with Antony. With Cleopatra ended (B.C. 30) the dynasty of the Greek kings of Egypt, which commenced with Ptolemy, the son of Lagus, B.C. 323.

She had by Julius Cæsar a son, Cæsarion, who was put to death by Octavianus. By Antony she had three children, Alexander, Ptolemy, and Cleopatra, all of whom adorned the triumph of Octavianus at Rome. Cleopatra afterwards married Juba, king of Mauritania. [ANTONY, AUGUSTUS, CÆSAR.] (Plutarch's *Life of Antony;* Appian; Dion Cassius.)

CLE'PSYDRA (κλεψύδρα, from κλέπτειν, ὕδωρ). Before the invention of pendulum clocks, it was not unusual in astronomical observations to measure time by the flowing of water, upon a principle which, in its most simple application, resembled that of the hour-glass, but which was varied by contrivances for accuracy or ornament. Such an instrument was used, up to the time of Galileo, by Tycho Brahé for instance, but as he does not describe it among his instruments, we suppose he hardly considered it as among the primary aids of an observer.

The Chaldæans, it is said, divided the zodiac into twelve equal parts, as they supposed, by allowing water to run out of a small orifice during the whole revolution of a star, and dividing the fluid into twelve equal parts, the time answering to each part being taken for that of the passage of a sign over the horizon. The authority for this story is Sextus Empiricus (*Adv. Math.* cap. 21), who adds, that they regularly used the instrument in finding their astrological data, and remarks that the unequal flowing of the water, and the variations of temperature of the atmosphere, would affect the accuracy of their results. Pliny mentions Scipio Nasica as the first who introduced clepsydras into Rome.

We might perhaps object to Sextus Empiricus as an authority on Chaldee usages, but a good presumption of the early use of clepsydras in India is afforded by the arithmetical treatise of Bhascara, written in the twelfth century. The prediction at the birth of his daughter, Liliwati, was that she should die unmarried. The father determined to have at least one struggle against the prophecy, and accordingly procured a bridegroom and an astrological determination of a lucky hour. The girl remained in her ornaments near the clepsydra, watching for the moment when she and her parent might set fate at defiance. But at length it was ascertained that the hour was past; and on examining the clock, which should have prevented such a catastrophe, it was found that a pearl had escaped from the daughter's dress and closed the orifice through which the water should have flowed. The father, thus disappointed, said to his unfortunate daughter, 'I will write a book of your name, which shall remain to the latest times.' The Liliwati accordingly remains, and bids fair to realize the prediction. (Taylor's *Liliwati*, Bombay, 1816.)

In the account given by Vitruvius (*De Architectura*, lib. ix.), he attributes the invention to Ctesibius: but the instrument described is so complicated that we by no means suppose he intends to assert that this was the first application of the principle even at Alexandria. Some mode of measuring time by the efflux of water, however rude it might be, was used at Athens before the time of Ctesibius, as we see by various passages in Demosthenes. The instrument described by Vitruvius is an elaborate contrivance, which shows the hour, day, month, and sign of the sun. The astronomical clepsydra was rejected by Ptolemy on account of its imperfections, and it is not necessary to follow the moderns through the various modifications under which they have attempted to apply the principle. Such instruments continued to be common, as toys at least, till the middle of the last century.

If we suppose a clepsydra made of a glass cylinder, with a very small orifice at the bottom, and the apparatus to be filled with water, and the orifice then to be opened, the upper surface of the fluid will not descend equally in equal times, according to the notion which Sextus Empiricus attributes to the Chaldæans. If the water be perfectly pure, and the orifice very small and unclogged, the following will be the law of descent. Ascertain first the whole time of emptying the cylinder: then in the fraction m of the whole time, the fraction $m\ (2-m)$ of the fluid will have discharged itself; or that same fraction of the whole height will have been fallen through. Thus in one-half the whole time of emptying, $\frac{1}{2}\ (2-\frac{1}{2})$ or $\frac{3}{4}$ of the whole fluid will have been discharged, while in $\frac{1}{4}$ of the whole

time $\frac{7}{16}$ of the whole will have been discharged. It is totally out of the question to suppose that the ecliptic was so nearly divided into twelve equal parts as actually was done, by any such imperfect process; though it is not impossible that by keeping the clepsydra constantly full, or very nearly so, equal times may have been estimated by the discharge of equal bulks of fluid. Supposing the cylinder to be kept constantly full, it would discharge its own bulk of fluid in exactly one-half the time in which it would empty itself undisturbed.

CLE'PTICUS, a genus of fishes, of the section Acanthopterygii and family Labridæ.

But one species of this genus is known (*Clepticus genizara*), and this is from the Antilles.

The generic characters are:—head obtuse; mouth protractile; teeth minute, barely perceptible to the touch; body elongate, lateral line uninterrupted; dorsal and anal fins covered with scales nearly to their outer margins.

CLERC, JEAN LE, born at Geneva in 1657, was the son of Etienne le Clerc, and nephew to David le Clerc, a clergyman and professor of Hebrew at Geneva, both known for several theological works. Jean le Clerc early manifested great capabilities for learning joined to an extraordinary memory. He travelled in France and England, and at last settled at Amsterdam, where he became professor of philosophy and belles lettres and of the ancient languages. He wrote a vast number of books, of very unequal merit, on all sorts of subjects. Those which made most noise at the time concern Biblical history and theological controversy, such as Latin commentaries on various books of the Bible, 5 vols. fol., Amsterdam, 1710-31; 'Harmonia Evangelica,' in Greek and Latin, fol., 1700; 'Traduction du Nouveau Testament, avec des notes,' 4to., 1703. These works pleased neither Catholic nor Protestant divines, from their having a tendency to Socinianism—a tendency made still more manifest by another work generally attributed to him, entitled 'Sentimens de quelques Théologiens de Hollande touchant l'Histoire Critique du Vieux Testament,' followed by a 'Défense' of the same work, 2 vols. 8vo., 1685. In these the author openly attacks the inspiration of the Scriptures and the very foundation of Revelation. As a critic, Le Clerc published his 'Ars Critica,' 3 vols. 8vo., 1712–30, a work which is much esteemed; and he also edited the 'Bibliothèque Historique et Universelle,' a periodical begun in 1687 and closed in 1693, making 26 vols. 12mo.; the 'Bibliothèque Choisie,' 1712-1718, 28 vols. 12mo.; and the 'Bibliothèque Ancienne et Moderne,' 1726-30, 29 vols. 12mo. These literary journals enjoyed a good reputation in their days. He also wrote—1. 'Parrhasiana, ou Pensées diverses sur des matières de Critique, d'Histoire, de Morale, et de Politique,' 2 vols. 12mo., 1701, a compilation to which he has added some hasty reflections, and many favourable comments upon his own works. 2. 'Histoire des Provinces Unies des Pays Bas,' from 1650 to 1728, 2 vols. fol., Amsterdam, 1738. 3. 'Histoire du Cardinal de Richelieu,' 2 vols. 12mo., 1714; 4. 'Traité de l'Incrédulité,' 8vo., 1733, in which he examines and discusses the various motives and reasons which occasion many to reject Christianity: this work is written with considerable talent and judgment. He also wrote a number of polemical works and pamphlets, most of which were tinged with bitterness and dogmatism. Le Clerc was one of the first critics of his age, but it was an age in which the critical art had not attained a high degree of excellence. He was learned, had quickness and penetration, and a great facility of composition; but he generally wrote in haste and upon too many and various subjects, having at times five or six works in hand at once. He published also a supplement to Moreri's Dictionary, and several editions of ancient classics, among others, Livy, Ausonius, Sulpicius Severus, &c. This edition of Menander and Philemon's fragments was severely criticised by Dr. Bentley. In 1728, while he was giving his lecture, Le Clerc suddenly lost the use of his speech through a paralytic stroke. His memory also failed him, and he lingered some years in a state bordering upon idiocy. He died at Amsterdam, on the 8th of January, 1736.

CLERGY, a collective term, under which that portion of the population of a country is comprehended who are in holy orders. It is used in contradistinction to *laity*, which comprehends all other persons. Like most ecclesiastical terms, it is of Greek origin, the word κληρικός (clericus) having been used in the sense of 'appertaining to spiritual persons' by the Greek ecclesiastical writers. From *clericus* comes the word *clerk*, which is still a law-term used to designate clergymen, but which appears antiently not to have been confined to persons actually in holy orders, but to have been applied to persons possessed of a certain amount of learning.

The distinction of clergy and laity in the Christian church may be considered as coeval with the existence of the church itself; for in the apostolic period there were officers in the church specially appointed to discharge the duties of pastors or deacons, and even, as many suppose, bishops or overseers, who had the superintendence of various inferior officers. These persons, though they might not perhaps be entirely relieved from the ordinary duties of life so that they might devote themselves exclusively to their sacred office, yet must necessarily have been nearly so, and it is certain that they were nominated to their offices by some peculiar forms. Very early however the distinction became complete. The bishops, priests, and deacons of the Christian church, each ordained to the office in a manner which it was believed the founders of Christianity appointed, and each supposed to have received a peculiar spiritual grace by devolution from the apostles and from the sacred founder of Christianity himself, soon formed a distinct body of men demanding to be distinguished by some particular appellation.

In all Christian nations the distinction has been recognised by the political authorities, who have allowed certain social privileges or exemptions to the clergy. No inconsiderable share of temporal power, extending not only over the members of their own body, but over the laity, has in most states been conceded to them. In the great German confederation the sovereign power in some of the states was vested in ecclesiastics; while at Rome there has been for many ages an elective monarchy of ecclesiastics, in whom all temporal as well as spiritual authority has been vested.

It is easy to account for the ascendency of the clergy in the middle ages, and for the acquisition by them of so many valuable exemptions, and so much actual power. They were the best instructed part of the population. The learning of the age was almost exclusively theirs; and knowledge, if it is not itself power, is at least a means of obtaining it. Beside this they had a most powerful instrument with which to work upon the ruder minds of the laity, in the power vested in them of alone administering the sacraments of the church, and of regulating alone under what circumstances those sacraments ought to be administered. This enabled them to win acquiescence in any favourite design, sometimes by gentle influences and sometimes by terror.

The history of almost every country of modern Europe presents instances of struggles between the laity and the clergy for power or privilege. Our limits will not permit us to enter on these, not even on the struggles of this kind in our own country, where they were as determined, and sometimes as fierce, as in any country of Christendom. All power in the clergy of England to erect an authority dangerous to the laity, or to secure to themselves political immunities or privileges inconsistent with the general good, was broken at the Reformation. The clergy of England then became but a fragment of a once great and well-disciplined body, dispersed through the whole of Christendom, which, when acting with common effort, and putting forth all its strength, it had been difficult for any single temporal prince to resist with effect.

We shall take from Blackstone a short statement of the privileges which the law of England allows to the clergy. They are but a faint shadow of the privileges which the clergy enjoyed before the Reformation. A clergyman cannot be compelled to serve on a jury, or to appear at a court leet or view of frankpledge. He cannot be compelled to serve the office of bailiff, reeve, constable, or the like. He is privileged from arrest in civil suits while engaged in divine service. He could claim benefit of clergy more than once. (BENEFIT OF CLERGY, p. 226.) Such are the legal exemptions. On the other hand, the clergy cannot now sit in the House of Commons, nor can they engage in any kind of trade, though sometimes clergymen have been brought within the scope of the bankrupt laws. By the law as it stood previously to the 57 Geo. III., c. 99, they were not allowed to take lands to farm, but by that act (s. 2) they are permitted (with the consent of the bishop of the diocese) to

farm lands to the extent of 80 acres for a term not exceeding seven years.

The clergy meet by delegates in convocation at the beginning of every new parliament, but this is now merely a form, the king, as supreme head of the Church of England, invariably dissolving the convocation before they can proceed to any business. They have however still courts in which jurisdiction is exercised touching ecclesiastical affairs, and causes testamentary or matrimonial, and where the church's censures are directed against particular classes of offenders. To them also belongs the whole ecclesiastical revenue, with divers fees or customary payments, and to them also the whole regulation of the terms of admission to their order.

The three great classes of the English clergy are the bishops, priests, and deacons. To be admitted into each of those classes requires a peculiar ordination. This distinction is of an entirely different kind from that which arises out of office or appointment. Of this kind of distinction there is in the English clergy the archbishop, the bishop, the dean and canons of a conventual or collegiate church (some of the canons being in many instances invested with particular characters, as precentors, succentors, and the like), the archdeacon, the rural dean, the dean of some church whose constitution is peculiar, the rector, the vicar, the curate in some chapels called parochial, the minister in some newly-founded chapel, whether a chapel of ease or what is called a proprietary chapel, assistant ministers to aid the vicar or the rector in some churches of antient foundation, and, finally, a body of persons called curates, who are engaged by the incumbents of benefices to assist them in the performance of their duties, but who are not dismissible at the caprice of the incumbent, nor left by law without a claim upon a certain portion of the profits of the benefice.

These are the various offices in which the clergy of the church of England are distributed. As the subject is of importance, and seems to be but imperfectly understood, we shall here briefly notice wherein lies the distinction of *rector*, *vicar*, and *curate*, to one of which belongs nearly every individual of the English clergy.

For this purpose, England must be regarded as divided into something more than 10,000 small districts, varying in extent, called parishes. Each of these parishes must be regarded as having its church, and one person (or in some instances more than one), who ministers divine ordinances in that church. This person, whose proper designation is *persona ecclesiæ*, enjoys of common right the tithe of the parish, and has usually a house and glebe belonging to his benefice. When this, the original arrangement, is undisturbed, we have a parish and its *rector*. But in the times before the Reformation it was a very common practice of the *patrons*, or persons who had the right to nominate the persona or rector, to give that right to some monastery or community of religious. Such community, instead of nominating some person as rector, would profess to discharge the duties of the parish by sending from time to time one of its own body to perform those duties, or by engaging some person at a stipend, settled by themselves, to perform the duties, they taking the tithe and other profits of the benefice to the use of their house. Some few of the antient parishes of England have thus been entirely stripped of their tithe and the other property out of which a resident minister might have been supported; but in nearly every instance the bishops interfered, and compelled the religious houses to settle some determinate share of the profits of those benefices upon a clergyman who should be fixed in the parish upon the nomination of the monastery, but no more removable than if he had really been the persona or rector. This person was called the *vicar*, *vicarius*, that is, one who stands in the place of another; and the other whom the vicar represented was in this instance the religious community, in whom vested the two characters of patron and rector. The provision made for the support of the vicar varied in different parishes, but it was usually some fixed portion of the tithe with the oblations. The agreement however, which was between the religious community and the bishop, was arbitrary, and hence it is that we find the vicars so variously endowed. At the Reformation, whatever interest the religious communities possessed in the parishes was seized by the crown, and has since been either retained by it, or, what has usually been the case, has been sold to private persons, whence arises the class of the *lay impropriators*, who are, in fact, the rectors of the parish, the performance of the spiritual duties devolving on the vicar. *Curates* who are not merely assistants to a rector or a vicar, are in general incumbents of churches in which no vicarage was ever ordained, or incumbents of chapels of foundation later than the æra of the foundation of parishes, and endowed by the special bounty of particular persons. [CHAPEL.]

CLERGY, BENEFIT OF. [BENEFIT OF CLERGY.]

CLE'RIDÆ (*Tillidæ*, Leach), a family of Coleopterous insects, of the section Malacodermi. Characters: palpi generally clavate; mandibles dentated internally; penultimate joint of the tarsi bilobate; antennæ more or less serrated or terminated by a club; body generally cylindrical and pubescent; head and thorax narrower than the abdomen; eyes emarginated. Most of these insects are found on flowers and some on old trees: the larvæ of those which are known are carnivorous.

The principal genera included in this family are *Cylindrus*, *Tillus*. *Priocera*. *Axina*, *Euryplus*, *Thanasimus*, *Opilus*, *Clerus*, *Necrobia*, and *Enoplium*.

The genus *Clerus* is thus characterized: maxillary palpi with the terminal joint thicker than the rest, compressed, broadest at the apex, and truncated; labial palpi with the terminal joint securiform; antennæ with the basal joint rather long, the seven following short, the three terminal joints forming a compressed knob of the form of a reversed triangle; tarsi exhibiting only four distinct joints.

Two species of this beautiful genus (*Clerus apiarius* and *C. alvearius*) are natives of this country, but they are here of rare occurrence, though in Germany, France, and Italy, they are common, and are found on the flowers of umbelliferous plants.

Clerus apiarius varies from half to two-thirds of an inch in length, and is very thickly covered with hairs; it is blue, the elytra are red, and have three blue fasciæ, one of which is at the apex.

The larva of this species feeds upon those of the common hive-bee, and is sometimes very destructive to hives.

Clerus alvearius very much resembles the species just described, differing chiefly in having a blue spot in the region of the scutellum in addition to the three blue fasciæ on the elytra; its larvæ feed upon those of the mason bees.

Dejean enumerates thirty-seven species of the genus Clerus in his 'Catalogue des Coléoptères,' and it appears that the genus is not confined to any particular part of the globe, as is frequently the case.

CLERK, JOHN (of Eldin, N.B.), was the inventor of one of the most important parts of the modern British system of naval tactics. In 1779 he communicated to some friends his notions concerning what is technically called 'breaking the line.' In 1780 he communicated his plan to Mr. Richard Atkinson, the particular friend of Sir George (afterwards Lord) Rodney, and that distinguished officer, before leaving London, said he would strictly adhere to it in fighting the enemy. On the 12th of April, 1782, when the experiment was tried for the first time, it led to Rodney's decisive victory over the French, under De Grasse, in the West Indies. From that time the principle has been adopted by all British admirals; and during the last war, when Howe, Nelson, and others, executed the manœuvre in perfection, it was universally attended with success. (See *An Essay on Naval Tactics, systematical and historical*, with explanatory plates, in 4 parts, by John Clerk, Esq., of Eldin, Fellow of the Society of Scottish Antiquaries, &c.; also an excellent article in the *Edinburgh Review*, vol. vi., p. 301.) A few copies of the first part of this valuable Essay were distributed among friends in the beginning of 1782. This part was reprinted and published in 1790, and the second, third, and fourth parts were added in 1797. Mr. Clerk was no sailor, and had never even made a single sea-voyage.

Such is the account given by Mr. Clerk's relatives and friends, but it has been indignantly contradicted in various publications by General Sir Howard Douglas. In a circumstantial narrative of Admiral Rodney's battle, he proves that the passage of the British through the enemy's line, and thereby cutting off the rear ships, arose from the chance position of the two fleets, and was one of those happy and unpremeditated decisions of the moment which always characterise a great and successful commander. By a close examination of dates, he also shows that Mr. Clerk's ingenious essay could not have been communicated to Lord

Rodney before the engagement took place; and he supports these statements by letters and other documents which have fallen into his hands since the death of his father, the late Admiral Sir Charles Douglas, who was at that time Rodney's 'Captain of the Fleet,' and therefore minutely acquainted with all the transactions. (See the several publications on this subject by Lieutenant-General Sir Howard Douglas, Bart.)

CLERMONT, the name of several towns in France, of which the following are the only ones of importance.

CLERMONT-FERRAND is the capital of the department of Puy de Dôme; it is in the neighbourhood of the Puy de Dôme, and on a torrent which, rising on the side of that mountain, flows into the Allier: about 216 miles S. by E. of Paris, in a direct line, or 232 miles by the road through Nevers and Moulins: in 45° 46′ N. lat., and 3° 5′ E. long.

It is not known whether this town existed when Julius Cæsar invaded Gaul: it was certainly not the Gergovia, in attacking which he experienced his most considerable check. Strabo mentions it under the name of Νεμωσσὸς (Nemossòs), and calls it the metropolis of the Arverni, from whom Auvergne is named: Ptolemy calls it Αυγουστονέμετον. In the Theodosian table the name is found in a contracted form, Aug. Nemeto. At a subsequent period it assumed the name of the tribe to which it belonged; and it appears under the name of Arverni, or Urbs Arverna, in the pages of Ammianus Marcellinus and Sidonius Apollinaris, in the 'Notitia Imperii' and the 'Notitia Provinciarum Galliæ.' In the middle ages, the castle by which the town was defended, was named *Clarus Mons;* and this name, which at first was restricted to the castle, was afterwards extended to the whole town.

In a council at Clermont, held A.D. 1095, the first crusade was resolved on. Pope Urban II. presided. The transactions of this council were numerous and important. In the middle ages, and up to the period of the French revolution, Clermont ranked as the capital of Auvergne. The bishopric originated in the third century, and the bishop held the first rank among the suffragans of the archbishop of Bourges; and until the erection of the bishopric of St. Flour in 1317 was the only bishop in Auvergne. The diocese at present comprehends the department of Puy de Dôme, which had in 1832 a population of 573,106.

This town is delightfully situated in a part of the rich plain of the Limagne, in a nook nearly embosomed in the hills which rise round the base of the Puy de Dôme, and which surround the town on every side except the E. and N.E.: it is close to a small mountain-torrent which flows into the Allier, from which river Clermont is distant about six or seven miles. In approaching the town from Paris, the traveller passes through the little town of Montferrand, containing some 3000 or 4000 inhabitants, situated on a little eminence, and having very steep streets. It was one of the strongest places in Auvergne; but its walls have been demolished and the ditches filled up. This place has been, since 1731, regarded only as a suburb of Clermont. It has some cavalry barracks, the diocesan seminary for the priesthood, and a church remarkable for its large nave unsupported by pillars. Here also is held a large cattle-market. From Montferrand to Clermont is a noble road or avenue, two miles long, perfectly straight, and bordered with willows and walnut-trees. Clermont itself, built on an eminence, forms, when viewed at a little distance, a noble termination to this avenue, and inspires the traveller with a notion of its beauty which the interior of the town does not keep up. It is not well laid out; the streets are narrow, and the houses, though not ill built, yet present, from the dark colour of the lava, which is the chief building material, a sombre appearance; several are however white-washed. There are several *places*, or squares; and the original town of Clermont is separated from the faubourgs, which (exclusive of Montferrand) comprehend half its extent and a third of its population, by a line of boulevards, which are for the most part planted with trees. The *place* of Le Taureau is remarkable for a handsome fountain in form of an obelisk, dedicated by the townsmen to the memory of General Desaix, who was born in the neighbourhood: this *place*, and those of Poterne and of L'Espagne, command most agreeable prospects: that of Champleix is adorned with a Gothic fountain, richly sculptured, which was formerly in the cathedral close.

Of the public buildings the cathedral is the principal: it is on the central point of the city; and though it has never been completely finished, it is regarded as one of the finest monuments of Gothic architecture in France. It is built of the lava of Volvic, the dark hue of which is in keeping with the style of the building. Of five towers which formerly adorned it, four were destroyed in the revolution; from the summit of the remaining one is a beautiful prospect, extending on every side of the town. The nave and choir are remarkable for their lofty elevation, and the lightness and arrangement of the pillars which support their vaulted roofs. The carving of the wood-work of the choir is exquisite. There are some beautiful painted windows, but they have been much damaged. This cathedral, the fourth which has been built here, was begun as far back as A.D. 1248. The first cathedral was destroyed by the Allemanni, the second by Pepin le Bref, and the third by the Northmen. The church of Notre Dame du Port is very ancient; several parts of the present building belonged to the original church, erected in the sixth century, and destroyed by the Northmen in the ninth.

There are two handsome halls, or covered markets, one for linens, the other for corn; a town-hall with courts of justice, lately built; and a handsome *collège royal*, or high school, which contains 500 pupils. There were, before the revolution, several monastic establishments, the buildings of some of which yet remain, and are of good appearance; there are some good inns, and a number of handsome private houses. The *place* Jaude, used as the *place d'armes*, or parade for the troops, is a very large parallelogram surrounded by private houses mostly new and well built.

The inhabitants of Clermont amounted, in 1832, to 24,077 for the town, or 28,257 for the whole commune: we presume that in the latter number the population of Montferrand is included. Clermont is not the seat of any important manufacture, but considerable trade is carried on; the situation of the town causing the inhabitants of the department of Puy de Dôme, and of the neighbouring departments of Cantal, Lozère, Haute Loire, and Aveyron, to resort to it to exchange their cheese, their cattle, and their wool, for the articles which are sent from Paris. Hemp, linens, fruit, and the wines of the Limagne, find a market here: the wines were commonly sent to Paris, until the charges made at the barriers of the metropolis on the inferior wines were rendered equal to those on the wines of superior quality. Some coarse woollen cloths, paper, hats, silk stockings, pipe-clay, sweetmeats, pottery, Prussian-blue, and glue, are made in the town; there are some tan yards and breweries, and a refining house for saltpetre. Clermont is one of the places by which the commercial communication between Lyon and Bordeaux is carried on. The transit of goods is chiefly effected by mules; there is no navigable river in the neighbourhood; the navigation of the Allier does not commence till many miles lower down. Clermont is famous for its preserves of apricots and apples.

There is a high school (already mentioned); a public library of 16,000 volumes, tolerably well chosen, which owes its origin to the celebrated Massillon, once bishop of Clermont; a museum of mineralogy, very rich especially in the minerals of the district; a large botanic garden, well kept up; and courses of public instruction, delivered gratuitously on botany, mineralogy, geology, arithmetic, and geometry, applied to the arts; writing, drawing, music and architecture. The library of the Academy of Sciences, Arts, and Belles Lettres of the town is adorned with a bust of Delille and a statue of Pascal. There is a handsome theatre near the cathedral. There are several hospitals: the Hôtel Dieu and the Hôpital Général are the principal. The Cour Royale, to the jurisdiction of which the department is subject, has its seat not at Clermont, but at Riom, a small town in the department. Clermont is the seat of a conseil académique.

Among the eminent natives of Clermont, Pascal, the author of the 'Lettres Provinciales,' holds the first place.

Clermont is distinguished by some remarkable mineral springs: that of Jaude, near the *place Jaude*, is intermittent: it flows steadily for a few minutes, then suddenly gushes out with a violent ebullition, which also lasts some minutes; it then returns to its previous equable flow, and then alternates. The fountain of St. Alyre, which derives its name from the Benedictine abbey of St. Alyre, in the Faubourg St. Alyre, is still more remarkable. It forms a streamlet which, running through some kitchen gardens,

deposits as it runs a calcareous sediment, and gradually raises its bed until it attains the level of its source, when the waters, unless a new channel be found for them, overflow on all sides. These deposits harden as they are formed, and the proprietors of the gardens are obliged, from time to time, to alter the course of the stream and to break up the incrustations to prevent the land being covered by them. In one instance where they allowed the incrustation to remain and increase, the consequence has been the formation of a natural dyke or wall 250 or 260 feet long, which preserves nearly the same level, while the ground on which it stands has a gradual slope, so that it appears at one end to rise out of the ground; while at the other it has a height of 17 feet and a breadth of 13 feet. At its extremity this dyke has formed a natural bridge over a brook which crosses its direction, and into which the streamlet flowed. The raising of the bed of the streamlet led to the formation of a small cascade, which increased in height as the bed rose higher and higher, and threw its waters farther into the current of the brook: this current prevented the extension of the dyke at the bottom, but the continued deposits at the top caused it to impend more and more over the stream, and to throw out its waters farther until they fell on the opposite bank, and there forming new concretions, completed the arch. This bridge is somewhat broken. The owners of the gardens turn the streamlet to a profitable account by placing, where the waters have a fall, various objects, as fruits, flowers, birds, and other things, which are speedily covered with a hard calcareous crust.

The plateau of Gergovia, some five or six miles to the south-east of the town, is said by Vaysse de Villiers to have only the name in common with the Gergovia of which Cæsar had to raise the siege in his campaign against Vercingetorix (*Comment. de Bell. Gall.*, lib. vii.); but D'Anville seems to incline to a contrary opinion. The arrondissement of Clermont contained, in 1832, a population of 171,566. (Malte Brun; Vaysse de Villiers; Balbi; Expilly; Puchet, *Diction. de Géographie Commerçante*; *Tour in France* by F. J. Carey.)

CLERMONT DE LODE'VE, a town in France, in the department of Herault, near the right bank of the little river Lergue, which flows into the Herault. It is 367 miles S. by E. from Paris in a straight line, in 43° 38′ N. lat. and 3° 26′ E. long.

Clermont de Lodève is situated on the slope of a hill, in a territory fertile in grain and fruit, and supplying abundant pasturage: there is an antient castle. The population, in 1832, amounted to 5905 for the town, or 6199 for the whole commune. The inhabitants are engaged in the manufacture of woollen cloth for the Levant trade (a branch of industry introduced in 1678) and for home consumption, handkerchiefs, worsted and cotton stockings, verdigris, cream of tartar, vitriol, cotton yarn, and leather. In these articles, as well as in the agricultural produce of the neighbourhood, sheep, wool, wine, brandy, oil, and almonds, considerable trade is carried on. Clermont furnishes wool for the manufactures of Carcassonne, Lodève, Aubenas, Bedarrieux, &c. There are several considerable markets in the week.

CLERMONT-OISE. [Oise, Department of.]

CLEVES (Kleve, German), the most north-westerly district of the kingdom of Prussia, and part of the old duchies of Cleves and Guelderland, is at present one of the thirteen circles of the province of Düsseldorf, in the Prusso-Rhenish provinces. It contains about 185 square miles; six towns and seven villages; and in 1831 had a population of 42,194 souls, of whom about 37,500 are Roman Catholics. These numbers give an increase of 3582 since the year 1817. Cleves is bounded on the west by the Rhine, and on the north and west by Holland; the surface is a complete level, and the soil, though very sandy in many parts, has in general been rendered extremely productive by careful cultivation. In the westerly districts lies the extensive Reichswald, or Forest of Cleves: 31,000 acres of this circle are occupied by woods and forests, while of the remainder 58,350 acres are arable land, and 23,200 are in meadows or pastures. The stock of horses, in 1831, was 3964; horned cattle, 16,893; sheep and goats, 7060. The produce is chiefly wheat, rye, barley, oats, buckwheat, peas and beans, potatoes, cloverseed, butter, and cheese, of which three last-mentioned articles much is exported. Cleves is divided into eleven districts (Bürgermeistereien), and contains, besides the capital, the towns of Cranenburg, between the Maass and Waall, 1100 inhabitants; Calcar, 1900; Goch, a manufacturing town on the Nies, 3350; Grieth, 1000; Griethausen, 790; and Uedem, 1300. On a heath near Goch is a village of 2700 inhabitants, called the Pfulzdorf, or palatinate village, from its having been built by emigrants from the Palatinate. The manufactures carried on in this circle are cotton-yarn, woollens, silks, cottons, linens, cutlery, leathers, &c.

Kellen, in the territory of Cleves, is conjectured to be the site of the Castra Ulpia Leg. xxx. (Amm. Marc. xviii. 2), and Goch, the Quadriburgum Gugerni, who were forced to abandon the country about Cleves and between the Maas, Waal, and Rhine, in the times of Tiberius. (Tacitus, *Annal.* iv. 26; Eutrop. vii. 9.)

CLEVES, the capital of the Circle, and formerly of the duchy of this name, is pleasantly situated on the Kermisdahl, about a mile from the banks of the Rhine, with which it communicates by the Spoy canal. It is walled, well built, and divided into the Upper and Lower towns; but the Upper being built on three hills, the streets are steep and irregular. Formerly it was fortified, and was considered a place of strength until the middle of the sixteenth century. It contains a cathedral, built in 1346, with two towers, a Catholic church, three Protestant churches, a synagogue, and a royal palace, called the Schwanenburg, the tower of which, built by the duke of Cleves in 1439, is extremely massive, and being on the highest point of the hill on which the palace stands, forms a stately ornament to the town. There are extensive gardens round the palace, which contains a valuable collection of Roman antiquities found in the town and its environs: it is now used partly as government offices, and partly for a prison. Cleves possesses a high-school, three hospitals, a house of industry, house of correction, &c. The houses, about 950 in number, are built in the Dutch style; the population is about 7000; it increased, between 1765 and 1810, from 4977 to 5200; and between 1817 and 1831, from 6511 to 6967. The manufactures consist of yarns, cotton goods, silks, woollens, flannels, stockings, linens, tobacco, brass-ware, &c. There are three squares, or open spaces, and in the vicinity a park of about 700 acres, and a chalybeate spring surrounded by handsome grounds, which was opened in 1742. The place is much frequented by visiters in summer. Over the Middle Gate is a statue of Eumenius Rhetor, a Roman, who founded the first schools in Cleves. 51° 47′ N. lat., and 23° 46′ E. long.

CLIENT (Cliens), apparently derived from the verb *cluo*, 'to listen to,' 'to obey.' From the origin of the institutions of antient Rome, there appears to have existed the relation of patronage (patronatus) and clientship (clientela) Romulus, the founder of Rome, was, according to tradition, the founder of this institution. The cliens may perhaps be compared with the vassal of the middle ages. Being a man generally without possessions of his own, the client in such case received from some patrician a part of his domains as a precarious and revocable possession. The client was under the protection of the patrician of whom he held his lands who in respect of such a relation was named patron (patronus), *i. e.*, father of the family, as matrona was the mother, 'in relation to their children and domestics, and to their dependents, their clients.' (Niebuhr.) It was formerly the opinion that every plebeian was also a client to some patrician; but Niebuhr, in speaking with reference to the proposition that 'the patrons and clients made up the whole Roman people,' affirms that the proposition is only true 'if applied to the period before the commonalty was formed, when all the Romans were comprised in the original tribes by means of the houses they belonged to.' In the later times of the republic the clients probably, for the most part, consisted of liberti and their descendants. Between the patron and his client there existed mutual rights and obligations. The patron was bound to take his client under his paternal protection; to help him in case of want and difficulty, and even to assist him with his property; to plead for him and defend him in suits. The client on his part was bound in obedience to his patron, as a child to his parent; to promote his honour, assist him in all affairs; to give his vote for him when he sought any office, to ransom him when he was made prisoner and not able to pay the ransom himself; and to contribute to the portion of the patron's daughter. The patron succeeded to his property when the client died without heirs; which was also the law of the twelve tables in the case of a freedman

(Ulpian., *De Bonis Libertorum*) who died intestate and left no heir (*suus heres*). Patron and client were not permitted to sue at law, or give evidence against one another.

Originally patricians only could be patrons; but when, in the later times of the republic, the plebeians had access to all the honours of the state, clients also were attached to them.

The terms patronus and libertus, or even patronus and cliens, as used in the later years of the republic, and under the emperors, cannot be considered as expressing the same relation as the terms patronus and cliens in the early ages of Rome, though this latter relation was probably derived from the earlier one. When a foreigner who came to reside at Rome selected a patron, which, if not the universal, was the common practice, he did no more than what every foreigner who settles in a strange country often finds it his interest to do. The existing relationship at Rome between patron and client facilitated the formation of similar relations between foreigners and Roman citizens; the foreigner thus obtained a protector and perhaps a friend, and the Roman increased his influence by becoming the patron of men of letters and of genius. (See Cicero *pro Archia*, c. 3, and *De Oratore*, i. 39, on the 'Jus Applicationis.' See also Niebuhr, vol. i., p. 316, &c., and the references in the notes.)

As a Roman client was defended in law-suits by his patron, the word client is used in modern times for a party who is represented by a hired counsellor or solicitor.

CLIFTON. [Bristol.]

CLIMATE is a word which has been transplanted from the Greek into every modern European language. The Greek word κλῖμα (from κλίνω, to incline) seems originally to have been used to express the apparent inclination of the heavens towards the horizon; and it was afterwards used as a technical term in astronomy and geography to indicate generally the distance on the celestial sphere, as well as on the terrestrial globe, from the equinoctial line towards the poles.

The plural of this word, κλίματα (climata), however, was used in a somewhat different sense, and answered, in some degree, to our parallels of latitude. The Greeks supposed the celestial sphere to be divided into girdles or zones, parallel to the equator, and surrounding the whole sphere. They then endeavoured to ascertain through what stars the parallel circles forming the boundary-lines of such a zone were to be drawn, and what stars fell within the zone. The same division they afterwards applied to the terrestrial globe, ascertaining first the places through which the boundary-lines of the zones ran, and then determining at what distance from them the intermediate places were situated. These zones were called climata, or climates, and were used by them as we now use the degrees of latitude.

These climata of the Greek geographers however did not always embrace an equal number of degrees of latitude. The principle of the division into zones was the length of the longest days; and a difference of half an hour generally determined the breadth of one of these climates. For instance, one of the boundary-lines of a zone would run through the places in which the longest day had thirteen hours, and the other through those in which it was thirteen hours and a half. This was sufficient for their purposes in those parts of the globe where there was only a small number of places the position of which had been determined. But it was not sufficient for those parts where the number of places determined was greater, as in Greece and the adjacent countries. Here they gave a less width to the climata, allowing only a quarter of an hour for the difference between the boundary-lines of a climate. For instance, the southern boundary-line of such a zone would run through the places whose longest day was fourteen hours, and the northern through those in which it was fourteen hours and a quarter.

The greater exactness of modern astronomical observations has rendered this division of the globe useless, and we have substituted for it the notation by degrees of latitude. The Greeks, of course, made use of these climata as we do the degrees of latitude, to indicate in a general way the comparative temperature which a country enjoys by reason of its smaller or greater distance from the equator. Modern nations have adopted the term climate, but with a somewhat enlarged signification. Climate, with us, not only implies the greater or less degree of heat which a country is subject to, but also the quantity of moisture in its atmosphere, and, in general, all the phenomena which affect vegetation, and render a country a fit abode for men and animals.

Heat and moisture, properly speaking, constitute climate. The other phenomena, such as winds, electricity, &c., affect these constituents of climate; but they require a separate consideration, as modifiers of climate, according to the view which we take of the subject.

We may observe, that those places where a high temperature is combined with a great quantity of moisture, are the most fertile, and display the most luxuriant vegetation, provided the surface is not formed of naked rocks; but even the solid rocks will in time yield to the combined influence of heat and moisture, and be clothed with a rich vegetation.

The latitude of a place is generally considered as the principal circumstance in determining its temperature. It is laid down as a fact, that countries lying under the equinoctial line or close to it are subject to the greatest comparative heat, which constantly decreases with the increase of distance from that line. This general rule must be admitted to be true for all the countries which lie between the tropics and the pole; but it may be questioned how far it is true of the countries within the tropics. A glance at a globe or sphere shows that the sun at the end of the first month after the equinox has already advanced 12° of latitude towards the tropic; but in the second month it traverses only 8°. At the end of the second month it is consequently 20° from the equator. There remain therefore only 3½° to be traversed in the third month. The sun recedes from the tropic in the same way. It passes the first month through 3½°; the second through 8°; and the third through 12° of latitude. Hence it is evident, that at all places between 20° and 23½° of latitude, the solar rays during two months fall at noon either perpendicularly, or at an angle which deviates from a right angle only by 3½° at most. If we take a place intermediate between 20° and 23½° of latitude, the solar rays must fall on it during two whole months, either perpendicularly, or in a direction still less removed from the perpendicular than in the former case. On the other hand, when the sun passes the equator, two places on which the vertical rays of the sun fall on two consecutive days are nearly ½° of latitude distant from one another; and a place situated exactly under the equator has only during six days the sun as near its zenith as the above-mentioned places near the tropics have it during two whole months. We might therefore presume, that the summer heat of the latter position must be much greater than that of places near the equator. This degree of temperature must be increased by the greater length of the longest days, which near the tropic are 13½ hours; but at the equator are always of the length of 12 hours.

This reasoning is not contradicted by experience. The countries in which the greatest degree of heat is experienced lie near the tropic of Cancer. They are the countries on the banks of the Senegal, the Tehama of Arabia, and Mekran in Beloochistan. The antients were not unacquainted with this fact; and one of their most ingenious inquirers, Posidonius, was so struck by the peculiarities of the countries near the tropic, that, for the purposes of physical geography, he wished to consider them as forming a particular zone, different both from the equatorial zone and from the temperate zone, and separating these two in the form of a narrow belt. He observes that these countries are characterized by the aridity and sterility of their soil, and that no rain falls there, while the regions nearer the equator, having abundance of rain and moisture, are exceedingly fertile. (Strabo, ii.)

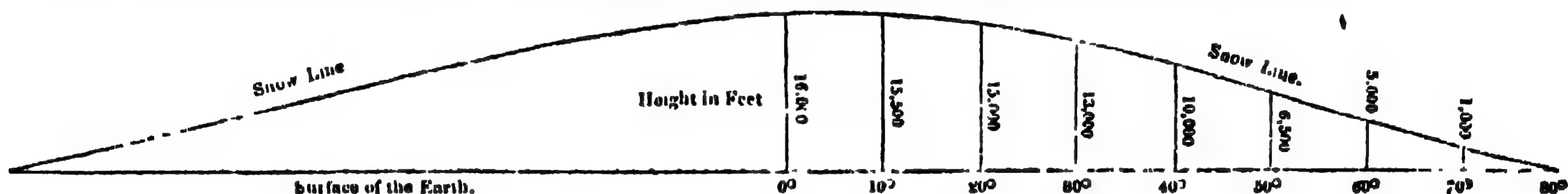
It remains however a question whether the mean temperature of places near the tropic is greater or less than that of places near the equator. During nearly eight months of the year the solar rays fall on the equator less obliquely than on the countries near the tropics; but it is not yet determined by exact observations if the greater degree of heat which these countries are subject to during that period is sufficient to compensate for the much greater degree of heat during the remainder of the year near the tropics. Very few meteorological observations made between the tropics have yet been published; and of these few we know not how they were made, and how they were affected by local circumstances. There is however a well-established fact which clearly seems to indicate that in summer the mean temperature near the tropics is higher than near the equator: this is the line of perpetual snow, which in the Bolivian

Andes is found to be at least 1000 feet higher than in the Andes of Ecuador, which are situated under the equator.

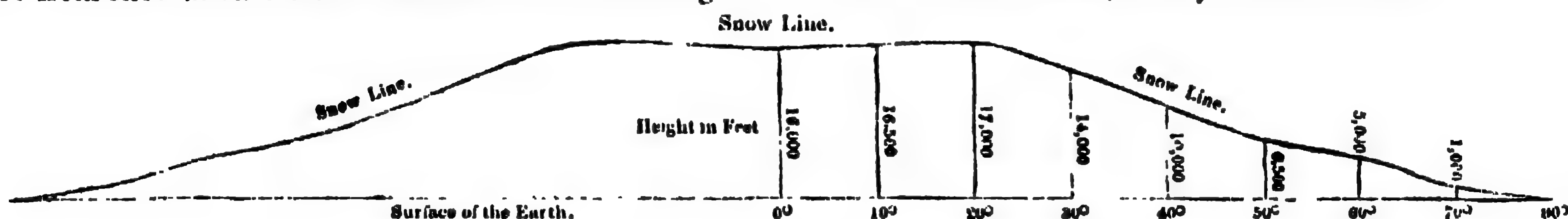
Though the mean temperature differs greatly in countries lying in different degrees of latitude, the most intense degree of heat which is experienced in all countries between the equator and 60° of latitude is nearly equal. The thermometer rises almost every year at St. Petersburg above 90°; and it is observed that even on the coast of Guinea, and on the banks of the Senegal, it rarely exceeds 95°. There are certainly instances in which it has attained a much higher degree. Dr. Coulter observed it at 140° on the banks of the Rio Colorado (32° 30′ N. lat.); but such exceptions must be ascribed to local circumstances, especially to the reflection of the solar rays from an arid and sandy surface.

The general rule derived from geographical position, as to the distribution of heat over the surface of the earth, is subject to many exceptions, arising from local circumstances. But none of these local circumstances probably affect it so much as the elevation of the surface. It is a well-known fact, that near the tropics and the equator there are mountains which, owing to their great elevation, are covered with snow all the year round. The heat experienced in a given place not only depends on the greater or less obliquity of the rays of the sun, but also on the greater or less column of the atmosphere. The column of air is greatest on the surface of the sea and in such countries as are nearly on a level with it. The higher we rise above this level the more the air is rarefied, and the degree of heat due to the solar rays decreases. Thus we at last arrive at an elevation where the heat, even under the equator, is insufficient to melt the snow. As the density of the air and the intensity of the heat continually decrease as we rise higher, some attempts have been made to determine the law of the decreasing temperature. Alexander von Humboldt, who has made a great number of observations on the steep declivities of the Andes near the equator, came to the conclusion that the thermometer of Fahrenheit descends one degree when we rise 343 feet above the level of the sea, and one degree for every 343 feet more. Thus the thermometer may be used to determine in a rough way the heights of mountains or of elevated plains. The calculations of Humboldt however are only founded on observations made in the intertropical countries, and it is supposed that the same law will not be applicable in all its extent to places situated without the tropics.

As already observed, at a certain height above the surface of the sea, the heat caused by the solar rays is too feeble to melt the snow and ice: this limit has been called the snow-line, or line of perpetual snow, or line of perpetual congelation. This snow-line does not occur in all places at the same elevation, but is dependent on the mean temperature in summer, and consequently on the latitude of a place. In warm countries it is consequently found at a much higher elevation than in cold countries. It has been ascertained by numerous observations, that in the Andes of South America, near the equator, the summit of a mountain rising to less than 16,000 feet does not attain the snow-line; but in Norway, in 60° of lat., mountains with an elevation of 5000 feet are always covered with snow, and in the southern hemisphere the line of perpetual snow in the Straits of Magalhaens (52° S. lat.) is, according to Captain King, about 3500 or 4000 feet above the sea. At about 80° of N. lat. the snow-line is considered to come down to the surface of the earth. Numerous observations made on the mountains of Europe, combined with those made by Humboldt in South America, suggested the idea that the snow-line forms a regular curve (north and south) on the surface of the earth in the following way:



But more recent observation has shown, that we are still very imperfectly acquainted with the laws by which this important boundary-line in the atmosphere is determined. Mr. Pentland ascertained by a great number of observations, that in the Andes of South America, between 14° and 17° S. lat., the snow line does not occur on mountains below the height of 17,000 feet. Poeppig, in traversing the Andes, near 11° S. lat., found that here also they were free from snow at an elevation several hundred feet higher than the snow-line under the equator. As the Bolivian and Peruvian Andes, on which these observations were made, exactly resemble those of Ecuador in their local circumstances, it may perhaps be a reasonable conjecture that the mean temperature in summer near the tropics is greater than under the equator: which is by no means improbable from other considerations, as we have shown above. The snow-line would then be represented, not by a curve of continuous curvature, but by one of this form.



These observations on the elevation of the snow-line above the level of the sea, are however only applicable to mountains which rise with a steep ascent, and are not contiguous to table-lands. High table-lands have a higher temperature than isolated mountains of the same height. Humboldt observed that the elevated plains on which the towns of Bogotà, Popayan, Quito, and Mexico are built, have a much warmer climate than they would have if elevation above the sea were the only element that determined the temperature when the latitude is given. In comparing the mean temperature of these plains with that of the adjacent coast, he found that the thermometer, instead of descending one degree for every 343 feet, had only sunk so much for every 400 feet of perpendicular elevation. He thinks that this difference may be accounted for by supposing that the temperature of the atmosphere, under these circumstances, is considerably raised by the reflection of the solar rays from a plain of considerable extent. This supposition is confirmed by the circumstance of the different heights at which the snow-line occurs on the southern and northern declivities of the Himalaya mountains. On the southern declivity of that range, which rises rapidly from the low plains of the Ganges, Mr. Webb found the snow-line at an elevation of about 13,000 feet, corresponding pretty well with its latitude (about 30°): but on the northern declivity, which is about a degree farther north the snow-line ascends to 16,000 feet; an elevation which corresponds to that found under the equator. On this side however, the range, though very steep, does not descend to a low country, but terminates in an immense plain, the surface of which is about 10,000 feet above the level of the sea. There seems hardly to be a doubt that the great difference between the elevation at which the snow-line occurs on the two declivities is principally to be explained by the difference in the height of the plains which are respectively contiguous to them.

Though this subject has lately attracted much attention, we are far from being able to explain all the deviations from the rule which have been observed. Thus the Pyrenees and Mount Caucasus are under the same parallel. The snow-line on Mont Perdu, in the Pyrenees, was found by Raymond at the elevation of 8700 feet; but on Mount Elburz, in the Caucasus, it only occurred at the height of 10,880 feet, according to Englehardt and Parrot. This fact is the more remarkable, as the countries contiguous to the Pyrenees have a much warmer climate than those which enclose the Caucasus. It is conjectured that this difference may probably be explained by the difference in the respec-

tive hygrometrical states of the atmosphere; on which however the necessary observations are wanting, especially for Mount Caucasus.

From these considerations it is evident that the temperature of a country, so far as it depends on latitude and on the elevation of its surface above the level of the sea, may be determined with a certain degree of exactness, or at least within certain limits. But temperature is still affected by several other circumstances and phenomena, whose influence cannot be subjected to calculation, and consequently cannot be brought under positive rules; at least not in the present state of our knowledge. Such circumstances and phenomena are, the nature of the soil, the prevailing winds, the quantity of moisture, the electrical state of the atmosphere, and the physical character of the adjacent countries and seas.

With regard to the soil, it is a well-known fact that the temperature of countries whose surface is covered with sand is higher than that of those in which it consists of clay or other compact soils. It is likewise observed, that where the soil has been to a great extent cleared and brought into cultivation, the air is much drier and warmer in summer than in those tracts which for want of cultivation remain covered with swamps and marshy grounds. This, according to Darby, is the case in the cultivated parts of the United States, in which he asserts, contrary to the vulgar notion, that in the cleared and cultivated tracts the summer temperature has been raised, and that of winter diminished. The latter circumstance would seem a natural consequence of clearing the surface and exposing it during the winter months to the full influence of the north-west winds. In fact, as the country becomes more open, the range of the thermometer increases. As far as we know, no attempts have been made to ascertain to what amount such differences in the soil affect the temperature of a country, though our knowledge seems to be quite sufficient to assign the reasons for the existence of such a difference.

The effect of the winds on the temperature of a place is still more obvious. It is a common observation that the thermometer is more or less raised or depressed by every change of the wind. But there is a great difference in this respect between the lower and higher latitudes. In the former a change of wind rarely raises or depresses the thermometer more than a few degrees, while in the higher latitudes it frequently happens that in a few hours a change of ten or twelve degrees, and even more, takes place. Captain Scoresby mentions an instance of this near the polar ice. On a sudden veering of the wind to the north, the thermometer fell, in sixteen hours, 34°, from + 32° to − 2°. But changes as great as this, so far as such changes are measured merely by number of degrees, occur in the United States of North America, at some distance from the Atlantic. Again, even in the lower latitudes, the change of the wind has a greater effect on the temperature on high table-lands than on low plains. Mr. Dunn states that on the table-land of Guatemala it sometimes, though very rarely, happens, that during the period of the northern winds a cold current produces a difference of 20 degrees in a few hours. A similar phenomenon has never been observed on the low coasts between the tropics.

It is a very common observation, that both cold and heat are more intense when the sky is clear than when it is overcast with clouds. Hence it may be inferred that countries whose atmosphere is more loaded with clouds and vapours than that of others in the same parallel, must have warmer winters and colder summers. This difference is observed all over the world, and from it arises the difference of climate in maritime and continental countries. It is even observed in countries which are at no great distance from one another, as in England and Holland. In England the mean temperature of the summer and winter is said not to differ more than 22° of Fahrenheit, while on the opposite shores of Holland it amounts to 27°, the winters there being a little colder and the summers somewhat warmer than with us. On this however we must observe that even supposing the mean temperature of a large tract of country to be ascertained, which, as is well known, never has been done, there is no very great propriety in comparing the mean temperature of a country of the form and position of England with one of the form and position of Holland. If two points under the same latitude, and both near the sea were taken on the opposite coasts of England and Holland, the difference, whatever it might be, would obviously be owing to the difference in the tracts of country contiguous to the respective places, to the winds, and to the hygrometrical state of the atmosphere. Before any safe conclusion could be drawn, all these conditions should be known. There appears no doubt however that the difference in the mean temperature of the two seasons increases as we proceed further east in the European continent; and it is equally certain that it depends mainly on the hygrometrical state of the atmosphere, which again in a great degree depends on the winds.

Since the time of Franklin, the attention of observers has been drawn to the effects which the temperature of one country has on that of contiguous countries. In calm weather that effect is probably so small as not to be perceptible. But whenever a wind is stirring, it brings the colder or warmer air from one country to the other, and thus lowers or raises the temperature of that country to which it blows. This effect is very perceptible on the eastern shores of England, with respect to the easterly winds. In the latter part of the spring or early in summer, these winds, before they reach England, pass over the still chilled and damp surface of the great plain of Northern Germany, and blight the already advanced vegetation of our eastern counties. On the contrary, in autumn the same winds pass over a sandy soil, which during the summer has acquired a considerable degree of heat, and the air brought over by them is warm enough to raise the thermometer several degrees. A still more remarkable instance is mentioned by Poeppig, in his 'Travels through Chile, Peru, &c.' In the southern districts of Chile, the eastern winds, called there los Puelches, when they blow in spring (September) are so cold that they depress the thermometer in a short time 15 or 18 degrees; but towards the end of the summer (February) they raise it nearly as much. He attributes naturally enough the first effect to the chain of the Andes being covered with deep snow during the spring, and the second to the high temperature to which the air upon the sandy plains of the Pampas of Buenos Ayres is raised during the summer months.

Considering the great effect which the temperature of countries contiguous to one another exercises on their respective climates, we may presume that a similar effect is produced by seas similarly situated. This has been long ago shown by the observations made on the regular change of the land and sea breezes in warm countries, and by the explanation of this phenomenon, which is obvious and simple. But it has only been recently ascertained that the proportion between the temperature of the sea-water and the atmosphere above it is not every where the same, but that in some parts the sea-water is warmer than in others under the same latitude. Now the temperature of the water must in some degree affect the temperature of the atmosphere, and this atmosphere, when brought into contact with the air of the land by the winds, must produce a change in its temperature. This consideration may sufficiently explain why the countries round the Mediterranean enjoy a much milder climate than all others placed under the same parallel. It is now ascertained that the temperature of the water of the Mediterranean Sea is from 4° to 5° higher than that of the Atlantic in the same parallel. This may perhaps lead us to the explanation of the greatest anomaly of climate which exists on the globe—we allude to the great difference of temperature existing between the western countries of Europe and all the other countries of the globe lying in the same parallel.

Those who had the first opportunity of observing the difference in temperature between western Europe and the eastern coasts of North America were natives of western Europe, and of course they considered the climate of their own countries as constituting the rule, and that of North America as the exception. They accordingly attempted to explain this phenomenon by reference to some peculiarities which characterize North America as a continent, such as the increase of its breadth towards the poles, the stretching out of the continent so far to the north, its large rivers and lakes, &c. But when the temperature of Asia and the eastern countries of Europe was ascertained by observation, it appeared that their temperature differed as much, and in many places still more, from that of the western countries of Europe than North America does. The climate of America may therefore be considered as the rule, and that of Europe the exception. Still the question remains,

to what peculiar circumstance it is owing that the temperature of Western Europe differs from that of America and the countries lying farther east in the same latitude by 8° or 10°.

We venture to offer an opinion that the Gulf Stream is the most active, if not the only, cause in producing this difference. This remarkable current stretches across the Atlantic between Cape Hatteras, in North America (35° N. lat.), and the Azores, forming nearly in the middle of the Northern Atlantic a lake of warm water, which, according to the calculations of Major Rennell, is not inferior to the Mediterranean in extent. The temperature of its water is from 3° to 10° higher than that of the surrounding sea. The temperature of the superincumbent air is likewise several degrees higher than it is farther to the west and south, but less so when compared with those portions of the Atlantic which lie farther to the east and north-east. We think that this last difference is due to the strong gales which are almost continually experienced in navigating the Gulf Stream, but more especially on its borders; they blow most frequently from the south-west and west. Winds blowing from these quarters are by far the most prevalent in the Northern Atlantic, and it is observed that even on the coast of Western Europe they still preserve the character impressed upon them by the gales of the Gulf Stream. They do not blow equably like the other winds, but in abrupt gusts, with short intervals of calm. These winds appear to waft the warmer air of the Gulf Stream over the whole of the coasts of Western Europe from Cape Finisterre as far as North Cape; they even penetrate through the wide gate between the Harz mountains and the Scandinavian ranges into the recess of the Baltic, and their effects extend to the very plains of Russia, where they are met by the prevailing north-eastern winds and stopped. All the countries within the range of these winds enjoy a much more favourable climate than those to which they do not extend.

It may here be objected, that as the Gulf Stream approaches much nearer the coast of North America than that of Europe, and as the temperature of its water is also highest there, such an effect as is here described should rather apply to the New than to the Old Continent. But, in the first place, the gulf stream along the coast of America is of comparatively inconsiderable width, being opposite Charleston only from 60 to 63 miles across; and, secondly, its waters in their whole course along that coast lose very little of their temperature. At Cape Hatteras, after a course of 900 miles, the stream has only lost 3° Fahr. of warmth. From this point it turns to the east, and the decrease of temperature begins to be somewhat greater. Yet even opposite the great bank of Newfoundland, after a course of 1300 miles through 15° of latitude, its waters have lost only 5° Fahr. of warmth, and the temperature in this part is from 8° to 10° above that of the adjacent seas. The decrease of temperature begins to be most considerable about the middle of the Atlantic. Now, when we consider that on the eastern coasts of North America likewise the western and south-western winds prevail, it follows that by far the greatest portion of the warm air derived from the evaporation of the Gulf Stream must come to those countries which lie to the leeward of these winds. The parts of North America, however, to the east of the Appallachian range, seem also to feel in some degree the heated air of the Gulf Stream; since it has been proved by Darby that they have a temperature by several degrees higher than the parts in the same latitude to the west of that range.

Another anomaly in temperature occurs in the countries which form the most southern part of the American continent. Humboldt has compared a considerable number of observations, from which it appears that south of 48° the mean temperature of South America is from 12° to 18° lower than that of those parts which lie in the same latitude. North of 48° S. lat. this difference is still considerable, but it gradually diminishes as we approach the tropics. At about 30° it seems to disappear entirely. It is not easy to account for this difference. It was formerly supposed that the ice enclosing the South Pole extended to a much greater distance from it than that which surrounds the North Pole. But Captain Weddel found very little ice in 74° 15′ S. lat.; and our whalers always find it in great masses within the same distance from the North Pole. Besides this, in the northern hemisphere, considerable icebergs advance as far as 40° 45′ N. lat., whilst in the southern hemisphere Captain Weddel says that there is no fear of falling in with ice north of 55° 20′. Many persons suppose that the peculiar form of South America, which narrows towards the south, and stretches out in the form of an acute angle, may be sufficient to explain this phenomenon; but though we admit that this diminution of the surface of the land may have some effect, it can only be a slight one, and, in our opinion, is not by any means sufficient to account for so great a difference in temperature.

There are other circumstances, besides those enumerated, which affect the general temperature, but their influence is confined to small tracts. Thus the temperature of some places is considerably raised or lowered from their being situated on the southern or northern declivity of a high range, or in a narrow valley, or from their being entirely or in a great part surrounded by water. Even the existence of large forests has some influence on the temperature of contiguous places. But as the influence of such circumstances is local, it may be sufficient here to indicate it.

The circumstances which tend to increase or to depress the general temperature of a country being so numerous, and their effect (in producing which several of them often co-operate) being in some instances very great, it often happens that the actual temperature of a country differs considerably from that which might be inferred from the latitude in which it lies. To show therefore what countries, situated under different parallels, have an equal or nearly equal temperature, the isothermal lines, or lines of equal temperature, have lately been introduced.

The second chief constituent of climate, the moisture of the air, appears under the form of rain, vapour, fog, and dew. The laws according to which moisture is distributed in the atmosphere of the globe are nearly unknown, few attempts having been made to ascertain them, with the exception of the rain, which is of a more distinct nature than the other phenomena. We shall limit our observations to rain.

There are extensive tracts of this globe on which a drop of rain is never known to fall, or only at intervals of many years, and then only in small quantities. These countries are always found near the tropics, sometimes extending on both sides of these circles, but often only on the side towards the poles, which circumstance is probably to be ascribed to peculiar localities. These countries may be said to run like two belts round the globe, dividing the countries on each side of the equinoctial line from the temperate zones, as Posidonius very correctly stated. It is only where mountain-ranges exist, that these belts of rainless regions are interrupted. Beginning with the Old Continent, we find in Africa the Sahara or Great Desert, on the southern borders of which the rains cease at about 16° N. lat. and on the north begin at about 28°. Proceeding farther east, the southern rains cease in the countries on the banks of the Nile between 18° and 19°, and the northern begin between 27° and 28°. Passing the Gulf of Arabia we find the Tehama, or low coast of Arabia, which is destitute of rains; but we do not yet know how far to the south or north the rainless region extends. The high table-land which backs this coast on the east is said to have annually some rain, but we have no account of this region on which we can rely; it may be that it owes this advantage to local peculiarities, especially to its elevation. Farther east the rainless region extends through Meckran, a province of Beloochistan, the desert of that country, and over the delta of the Indus. Here it appears not to comprehend more than 4° of latitude. From this point it turns to the north-east and extends to 30° N. lat., comprehending the Indian desert to the very base of the Himalaya mountains. Behind this range extends the high table-land of Tibet, which also has no rain. But at the eastern extremity of the Old Continent, in China, there is no rainless region, which may perhaps be owing to the circumstance that all the parts of China between 22° and 30° N. lat. are traversed by the high mountain chains of the Nan-ling and Yoo-ling, and consist of a continual succession of ridges and valleys.

The countries of the Old Continent contiguous to the southern tropic are not well known, but that part of Southern Africa, on the shores of the Atlantic, which extends to the north of the Gareep, or Orange River (between 24° and 28° S. lat.), is said to be a sandy desert, with little or no rain. Towards the Indian Ocean, Africa is traversed by several mountain-ranges, and consequently has there a somewhat moister climate. Australia also appears to be subject to the same disadvantages. The long droughts, sometimes

continuing several years together, which occur in our colony in New South Wales, indicate that a great portion of Australia must be reckoned among the countries which are entirely or nearly destitute of rain.

In America the rainless region near the tropics is less distinctly marked, probably on account of the comparatively narrow width of that continent near the tropics, and other local peculiarities; yet such a region exists in both hemispheres. In the northern it seems to occupy the coast of the Gulf of Mexico, between 24° and 26°, and to extend westward, comprehending the arid plains of Monterey and Chihuahua, till it reaches the northern portion of the Sierra Madre Mountains, whose northern extremity it surrounds. It then stretches along both banks of the Rio Gila to the Gulf of California, where it however does not terminate, as the peninsula of California has no rain north of 23°. The countries of South America, near the tropic of Capricorn, rise suddenly from the Atlantic Ocean to a considerable height, and take the form of high table-land, traversed by mountain ridges. These parts of course are not without rain: but nearly midway between both oceans the country sinks considerably lower, and the Grand Chaco or Great Desert occurs, in which rain seems to be very rare. This extensive plain is divided from the Atlantic by a mountainous country, and from the Pacific by the high range of the Andes. In both these mountainous regions rains are frequent; but on the coast of the Pacific, though it presents a very uneven surface, not a drop of rain is known to fall all the year round between 23° and 27° S. lat. This barren tract consists of the Chilese department of Copiapò and the Bolivian province of Atacama.

These two belts of rainless regions, which on the land are frequently narrowed or interrupted by local circumstances, have a more distinct character on the ocean. Rain seldom falls within the range of the trade winds, except on their very borders, both towards the region of the calms and towards that of the variable winds.

Between the two belts formed by the rainless regions are situated those countries which are subject to the equatorial rains. The ocean also has these rains in a small degree in those parts which constitute the region of calms. Here the phenomena of the atmosphere succeed one another with great regularity. The sun rises in a cloudless sky: towards noon some faint clouds appear near the horizon, which rapidly increase in extent and density, and are soon followed by thunder and violent gusts of wind, accompanied by heavy rains of short duration: towards evening the clouds disappear, and the sun sets in a serene sky of a deep blue hue. It does not appear that this state of the weather is at all affected by the seasons.

Those parts of both continents which lie on each side of the equator between the rainless regions, have the greatest quantity of rain, and this occurs at certain periods of the year, whence these rains are called periodical rains. The season of the rains depends on the position of the sun. It begins some time before the sun reaches the zenith of a place, and continues for some time after it has passed it; hence the rainy season varies with the difference of latitude. Though the observations which are requisite to determine this point are far from being sufficiently numerous, it would appear that those countries which are near the equator are never for many days altogether without rain, and that there the rainy season, which occurs when the sun passes over the zenith, is only distinguished from the other parts of the year by a greater continuance and a greater abundance of the rains. In the countries more than 5° of lat. distant from the equator, the dry and wet seasons are distinctly marked. The rains begin either immediately or not many days after the sun in its progress towards such a place has passed the equator. They are heaviest when the sun approaches the zenith of the place, after which they continue with less abundance for an equal or even longer time. In general the rains are more abundant in the first than in the second half of the season.

Countries that lie between 5° and 10° of lat. have commonly two rainy and two dry seasons. The greater rainy season occurs when the sun in its progress to the nearest tropic passes over the zenith, and lasts from three to four months. The less rainy season occurs when the sun on its return from the nearest tropic approaches the parallel of the place. The rains then last only from six weeks to two months, and are much less abundant and continual. Countries more than 10° or 12° from the equator have only one rainy and one dry season: the first begins when the sun approaches the nearest tropic, and ends some time after, when, in its course from the tropic, it has passed the parallel of the place. It lasts from four to six months. Such is the course of the rainy and dry seasons in these countries when their regularity is not disturbed by local circumstances, which sometimes effect considerable changes. The most remarkable deviation from this order occurs in India, where the period of the rainy and dry season is not regulated by the position of the sun, but by the change of the monsoons.

The periodical rains differ from the variable rains, which occur in the countries that lie without the tropics, not only in the greater regularity of the time at which they fall, but also in their abundance. The quantity of water which pours down between the tropics in one hour is often greater than that which falls in these latitudes in three or four hours. There is however an erroneous opinion prevalent respecting these rains: it is generally supposed that they continue for many days without interruption, but this is not the case: a day in which the rains fall without interruption from morning to evening is of much rarer occurrence between the tropics than with us; the sun usually rises in a cloudless sky: two hours before noon the clouds begin to appear, and at noon the rains set in. They then frequently pour down in torrents for four or five hours; but towards sunset they cease, the clouds suddenly disappear, and not a drop descends during the whole night. As the abundant rains, especially when the rainy season sets in, frequently cover the level and low country a foot deeper with water, the atmosphere of such tracts is continually loaded with vapours and exhalations during that period, which render the stars invisible at night, and are doubtless the principal cause of the unhealthiness of those countries.

The parts which lie between the rainless regions and the pole are subject to the variable rains. There is not a single day in the year in which it has not rained, or may not rain, and the rains are perhaps as common in the night as in the day. There are certainly differences, both in the quantity and in the time of the rains in these countries; but this difference can only be ascertained by comparing long sets of exact observations; and such exact observations are still wanting, except for the western parts of Europe. Comparing these observations, one would suppose that the countries south of 45° N. lat., with few exceptions, have also a kind of rainy and dry season, the former occurring in autumn and winter, and the latter in spring and summer. In summer frequently two or three months pass without a single drop of rain falling. In the countries north of 45° such a difference is not observed: there the greatest quantity of rain seems to fall in the summer, except in England, where the summer is the driest part of the year. The quantity of rain however decreases as we advance from the shores of the Atlantic to the inland parts of the European continent. The rains become again more abundant when we reach the plains of Eastern Europe, near Petersburg and Moscow, which may perhaps be owing to the circumstance, that here the winds proceeding from the Gulf Stream meet those which blow from the Ural Mountains and the great sandy deserts. These rules, derived from observations made in Europe, will probably not hold good for other parts of the globe, because the temperature of Europe forms, as we have observed, a great anomaly. Accordingly we find that the few meteorological observations which have been made in the United States are far from confirming these rules.

In estimating the climate of any given country, there are other phenomena which require notice; but their effect on climate has not been ascertained with any great precision, and there is reason to think that it cannot be very great, though electrical phenomena are thought by some to have considerable influence. They certainly change the condition of the atmosphere for a short time, which is most obvious in those violent thunder-storms within the tropics known by the name of typhons.

CLIMAX, (κλῖμαξ, a step or ladder) commonly called a figure of rhetoric, but properly only an artifice of style; for a figure or trope is a use of words in some other than their natural or literal sense. In accordance with the primary meaning of the Greek word, a climax in composition is a mode of expression by which the writer mounts, as it were, from one clause to another, as if he were climbing a series of steps. In other words, each clause expresses a higher degree of that which is stated in the preceding clause. The three words which Eustathius records to have been uttered

on occasion of one of his victories by Julius Cæsar—'Veni, vidi, vici,' form a climax. The following sentence addressed by Cicero to Catiline is another: 'Nihil agis, nihil moliris, nihil cogitas, quod ego non audiam, non videam, planeque sentiam' (You do nothing, you attempt nothing, you conceive nothing, which I do not hear, which I do not see, nay, which I do not even feel). 'A gradual progress from small to great,' observes Lord Kames (*Elements of Criticism*, chap. iv.), 'is not less remarkable in figurative than in real grandeur or elevation. Every one must have observed the delightful effect of a number of thoughts or sentiments, artfully disposed like an ascending series, and making impressions deeper and deeper; such disposition of members in a period, is termed a *climax*.' In another passage he makes an attempt to explain the effect asserted to be thus produced. 'If a number of objects of the same kind,' he says, (chap. xviii. §. 2,) 'differing only in size, are to be ranged along a straight line, the most agreeable order to the eye is that of an increasing series; in surveying a number of such objects, beginning at the least, and proceeding to greater and greater, the mind swells gradually with the successive objects, and in its progress has a very sensible pleasure. Precisely for the same reason, words expressive of such objects ought to be placed in the same order.' The effect of a climax would seem to be more simply accounted for by the consideration of the state into which the mind of a reader or hearer is necessarily thrown by any emphatic assertion in a vehement or impassioned discourse; he naturally expects that the next assertion, if another is to follow, will involve something still stronger or more exciting—that it will constitute some addition to what has been already said—else why should it be uttered at all? He is gratified, of course, when this expectation is fulfilled, and would be the reverse if it were not. The latter effect is produced by what is called an anti-climax, the slight shock of the disappointment occasioned by which is sometimes, in suitable circumstances, made available to produce the emotion of the ludicrous. Lord Kames (chap. xviii. § 1) reckons what he calls a *climax in sound* and defines to be the 'order of words or members gradually increasing in length,' as one of the beauties of language. One example of this which he gives is the following from Cicero: 'Quicum quæstor fueram; quicum me sors consuetudoque majorum; quicum me deorum hominumque judicium conjunxerat.' When the climax in sense and the climax in sound coincide in the same passage, he afterwards observes (chap. xviii. § 3), 'the concordance of sound and sense is delightful; the reader is conscious not only of pleasure from the two climaxes separately, but of an additional pleasure from their concordance, and from finding the sense so justly imitated by the sound.' We may remark that, although an anti-climax, except to produce a ludicrous effect, must always be regarded as a stumble in composition, and is therefore to be avoided, a climax is the favourite ornament of rather an artificial and mouthing style of rhetoric. A natural writer will commonly come out with the strongest thing he has to say at once, instead of cautiously advancing to it by this sort of measured dance. (For an example of climax from Demosthenes, see Demetrius Phal. Περὶ Ἑρμηνείας.)

CLINTON, DE WITT, has a claim to biographical notice chiefly as the persevering promoter of the project for the formation of the great canal from lake Erie to the Atlantic. He was born in 1769, at Little Britain, in the state of New York. His mother was one of the distinguished Dutch family of De Witt; and his father, who was of English extraction, served with great distinction as major-general in the army of the United States during the revolutionary war. De Witt received his education at Colombia College, New York, and was admitted to the bar. In 1797 he was elected, by the democratic party, to the state legislature of New York; having previously officiated for several years as secretary to his uncle George Clinton, as well as to the regents of the university, and board of fortifications, of New York. In 1801 he was elected a member of the senate of the United States. He afterwards filled the office of mayor of New York until 1815, when his retirement was occasioned by the violence of political parties. During the period between 1817 and 1826, he was several times elected governor of the state of New York by the zealous exertions of the democratic party. He was a member of most of the literary and scientific societies of the United States, and of several similar institutions in Europe. His productions consist of his speeches made on various occasions in the performance of his official duties; papers read before literary and benevolent societies; correspondence concerning the canal; judicial opinions, and various fugitive compositions. His services to his native state were important, and his character, as a lover of science and polite literature, was adorned by a generous benevolence. He died suddenly in 1828, and was interred with great public demonstrations of respect.

CLI'NUS, a genus of fishes of the section Acanthopterygii and family Gobiadæ. It forms one of the subdivisions of the Blennies, the species of which may be distinguished by their having several ranges of short pointed teeth, the teeth of the external range being the largest. The dorsal fin is either continuous and even, or, in some, with the anterior rays separated from the posterior by an emargination. Like the true Blennies, these fishes have small fimbriated appendages over the eyes. [BLENNIUS.]

CLIO (Zoology), CLIO TRIBE, CLIO'NIDÆ, a family of naked marine mollusks, placed by Cuvier as the first of his class *Pteropoda*. Lamarck also arranges them under the Pteropods, which he makes an order, but gives them a situation immediately after the *Hyalæidæ*. De Blainville unites the *Pteropoda* and *Gasteropoda* of Cuvier in one class *Paracephalophora*, under which the *Pteropoda* form an order with the name of *Aporobranchiata*, which is divided into two families; the first, *Thecosomata*, being provided with a shell, and the second, *Gymnosomata*, comprising those Pteropods which have none. Rang follows this last arrangement, still retaining Cuvier's term Pteropoda, but not rejecting De Blainville's, and making the *Clios* of Férussac synonymous with the *Gymnosomata* of De Blainville, and the second family of the class *Pteropoda*. The following is De Blainville's definition of his *Gymnosomata*:—

Body of an elongated form, subconical, completely naked; two bundles of tentacular suckers at the mouth; no tooth in the upper lip; a small lingual plate bristled with spines.

Rang thus defines the family:—Animal with the head distinct; no intermediate lobe, but one or more fleshy appendages in place of it; a muscular envelope or mantle.

Genera, Clio. (Clione, Pallas.)

De Blainville, who says that he characterized the genus from his own observations, gives the following definition:

Body free, naked, more or less elongated, a little depressed, attenuated abaft (aminci en arriere), without any other fins than the lateral appendages. *Head* very distinct, provided with six long retractile tentacula, divided into two groups of three each, and capable of being entirely concealed in a species of prepuce bearing a small tentaculum on its external side. *Mouth* entirely terminal and vertical. *Eyes* sessile, nearly supernal. A sort of sucker or rudiment of a foot under the neck, between the roots of the fins. *Vent* and termination of the *generative apparatus* in a single tubercle, situated at the right side of the neck, at the junction of the fin with the trunk. *Organs of Respiration?*

Rang thus describes the genus:—Animal elongated, enveloped *in a membranous and very contractile mantle*, with a head furnished with many long conical tentacula, which are retractile, and separated into two groups, and can be withdrawn at pleasure into small cavities destined for them. *Branchiæ* in form of a vascular net-work carpeting (tapissant) the fins. *Mouth* terminal. *Eyes* sessile? Three membranous appendages to the ventral part, and corresponding to the base of the fins. *Vent* and *organs of generation* situated in a tubercle on the right side.

Cuvier, who paid some attention to the Clios, thus defines the genus in the last edition of the 'Règne Animal:'—The Clios have an oblong membranous body *without a mantle*, the head formed of two rounded lobes, whence spring small tentacula. They have two small fleshy lips and a tongue (languette) at the front of the mouth, and the fins are provided with a vascular net, which performs the office of *branchiæ*. The *vent* and *generative orifice* are under the right gill. Some say that they have eyes. The mass of the viscera does not nearly fill the external envelope. The stomach is large, the intestine short, and the liver voluminous.

The principal discrepancies in the above definitions are the following:—1st. As to the mantle. De Blainville does not notice it; Rang expressly mentions a membranous and

very contractile one; and Cuvier directly denies its presence. There is not much real contradiction on this point. It may not be strictly correct to call the contractile sac which envelopes the Clio a mantle, any more than it would be to give that name to the test which is the investing integument of the *Ascididæ;* but all three authors must be taken to mean that the internal parts of Clio are surrounded and protected by a highly contractile integumentary envelope. 2nd. As to the organs of respiration. These appear to have entirely escaped the observation of De Blainville, while Cuvier and Rang point out their position and describe their structure. 3rd. As to the eyes. De Blainville expressly describes these organs and their position. Rang says eyes sessile? with a query, and Cuvier merely observes that some attribute to them eyes. That the Clios may be sensible of light is highly probable; but any thing like a well developed eye properly so called is not very apparent, in *Clio Borealis* at least.

a. Species whose tentacula are well known.

Of these, *Clio Borealis* and *Clio Australis* will serve as examples. The former, which appears to be the same with *Clio limacina* of Phipps, *Clio retusa* of Fabricius, and *Clione papilionacea* of Pallas, is well known to the whale-fishers and others under the name of '*whale's food.*' The species swarms in the northern seas, and indeed so plentiful are they that they form a principal part of the food of the whale-bone whales. Captain (now Sir W. E.) Parry found it in great abundance in all parts of Baffin's Bay and Davis's Strait, in the neighbourhood of ice. (*Supplement to Captain Parry's first Voyage.*) Captain James Ross observes that it is very numerous in most parts of the Arctic Ocean, but less abundant in Regent's Inlet and the Gulf of Boothia. When the weather is calm, they come in myriads to the surface for the purpose of respiration; but scarcely have they reached it, when they again precipitate themselves towards the bottom. Cuvier, who gives this account of their habits, adds, that the sea is so glutted with them in certain seasons, that the whales, so to speak, cannot open their mouths without ingulphing thousands of these small mollusks.

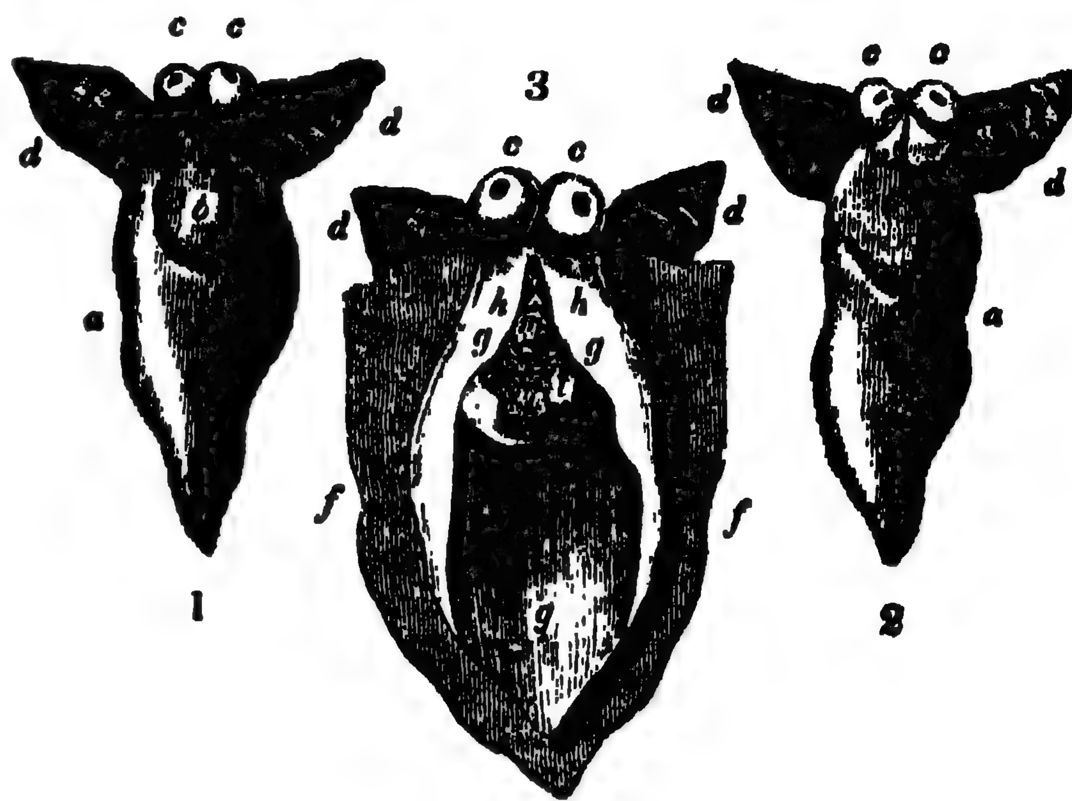
Integument, a delicate, demi-transparent, soft skin which covers a second tunic. This last is thicker, and presents longitudinal and very sensible muscular fibres, which come from two principal bundles attached to the sides of the neck. The effect of these fibres must be to shorten the general envelope of the body, and to approximate its form to a spherical shape. Cuvier, who gives the above description, adds, that he knows not with what the interval between this fleshy tunic and the mass of the viscera is filled in the living state; but observes that it is certain that these do not occupy the half of the area which the tunic incloses; and conjectures that there may be a liquor diffused there, or perhaps only a quantity of air which the animal can compress at pleasure when it would sink in the water, and dilate when it would rise.

Digestive Organs.—The mouth is between the bases of the two tubercles of the head. Below it are two triangular tentacula, which form, as it were, two small wings between the two large ones. The opening of the mouth is triangular; and within are seen some longitudinal wrinkles, which Pallas and Fabricius appear to have taken for teeth, but which have no hardness, and are entirely fleshy. The viscera are connected by vessels and cellulosities which unite them in a small packet situated near the neck. The liver covers the greatest part of them, with the exception of an angle which is occupied by the testicle and ovary. The *œsophagus*, of a fair length, descends from the mouth through the neck, and is dilated into a stomach towards the bottom of the mass. Thence the intestinal canal, after having made one fold, proceeds directly to the vent, situated under the gill of the left side. The *liver* is composed of many lobes and lobules, and envelopes the stomach and a great part of the intestinal canal. Two long and straight salivary glands float at the sides of the œsophagus: their excretory ducts are inserted in the mouth. (Cuvier.)

Brain, Nervous System, and Senses.—The brain consists of two lobes placed at the origin of the œsophagus. From each of these springs a small filament, which swells into a large ganglion that unites itself to its correspondent under the œsophagus. These two ganglions give out each their filaments to the neighbouring parts. Two of these filaments, one on each side, swell again into ganglions, which, uniting together by a new filament that traverses upon the œsophagus, form there a second collar joined to the first beneath: they give out a filament, which is twice swollen or knotted, and it is from these small knots of medullary matter that the different nerves arise. No eye could be perceived, nor any particular organ of the external senses, except the common and general organ of touch. (Cuvier.)

Respiratory and Circulating System.—Each gill gives off a vein, which, uniting to its correspondent in the shape of a Y, forms the trunk which reaches the heart. This last, situated in its pericardium on the left side of the mass of viscera, gives out, doubtless, arteries for the whole body, but they could not be followed out. (Cuvier.)

Organs of Reproduction—Very much resembling the Gastropods, and uniting, like them, the two sexes. The ovary gives off a delicate and short oviduct, which reaches the testicle. This last, which at its origin resembles a cæcum, lessens by degrees into a deferent canal, and terminates at a small round purse, which fills the left tubercle of the head, and has its exit near the neck. It is undetermined whether the straight and firm part which terminates the deferent canal is the penis, or whether that organ is hidden in the small purse above noticed. At the side of this purse is another oblong one, analogous to that which is termed the bladder (la vessie) in the ordinary gastropods. (Cuvier.)



[Clio Borealis.]

Fig. 1, Clio Borealis, view of the back; *a*, the body; *b*, the viscera, seen through the common integuments; *c*, the tubercles of the head, and the holes wherein the three tentacula on each side are withdrawn; *d*, *d*, gills and fins. Fig. 2, the same, view of the belly; *a*, *c*, *d*, indicate the same parts as in fig. 1; *e*, the two tentacula placed before the mouth. Fig. 3, *c*, *d*, indicate the same parts as in the two former figures; *f*, *f*, the external tunic or skin; *g*, *g*, the internal tunic or fleshy pannicle; *h*, *h*, the principal bundles of its fibres; *i*, the mass of viscera; *m*, the principal vein of the gills.

The finest specimen of *Clio Borealis* we ever saw is in the Museum of the Royal College of Surgeons (*Gallery Nat. Hist.*, 161 A.), presented by Captain (now Sir John) Ross.

The figures and description above given (Cuvier's) are taken from an individual which had its tentacula, &c., withdrawn.

β. Species without tentacula? and whose cephalic enlargement (renflement) is separated from the trunk by a sort of narrow and very distinct thorax. (Genus *Cliodites* of Quoy and Gaimard.)

Example, *Clio* (*Cliodites*) *Caduceus*. De Blainville observes that this species is too incompletely known to allow of a satisfactory conclusion as to what it is; and he even thinks that it may be identical with the *Clio Australis* of Bruguières.

Pneumodermon.

Animal oblong, subcylindrical, divided into two very distinct parts, the anterior conical, the posterior oval. The fins placed near the separation of these two parts, and presenting between them, and on the ventral side, a small membranous appendage. *Mouth* at the extremity of a sort of retractile proboscis, having, at its base, two bundles of tentacula, each terminated by a small disk or sucker. *Gills* situated at the posterior part of the body, and disposed somewhat in the form of two C's placed back to back, ƆC, and separated by two small bars. *Vent* on the right, and a little anterior to the gills. Orifice of the *organs of generation* in a common tubercle, situated at the root of the fin of the right side. Example, *Pneumodermon Peronii*. This is about an inch in length, and was discovered in the Atlantic ocean by Péron. The genus was established by

Cuvier. De Blainville founded his character upon many well-preserved individuals brought home by MM. Quoy and Gaimard from the expedition under Captain Freycinet, and gives Australasia as the locality of the species.

CLIO. [MUSEA.]

CLITE'LLIO. [LUMBRICUS.]

CLITHEROE, a market town, a parliamentary borough, and a parochial chapelry in that part of the parish of Whalley which is in the higher division of the hundred of Blackburn, and in the northern division of the county palatine of Lancaster, 216 miles N.N.W. of London, and 26 S.E. of Lancaster. Its population in 1831 was 5213, two-thirds of whom are employed in trade, and the rest in agriculture. Clitheroe is a borough by prescription; its earliest known charter is dated in the time of Henry de Lacy, who died in 1147; but it did not send members to parliament before the first year of Elizabeth. The late Boundary Act extended the parliamentary borough to the neighbouring chapelry of Downham, and the four townships of Whalley, Wiseyall, Pendleton *cum* Henshorn, and Little Milton *cum* Colcoats, and reduced the two members to one. The town is governed by two bailiffs, chosen annually by the burgesses and freemen. Three courts are held here, viz., the court-baron, the court-leet, and a court of inquiry, at which the bailiffs preside. They are held in the New Moot-hall, a modern building of the Gothic order, with a spire sixty-two feet high.

The name of this town, or, as it was antiently spelt, Cliderhaw, is descriptive of its situation, a hill by the waters. The family of De Lacy, who came over with the Conqueror, built the castle, consisting merely of a keep, with a tower and arched gateway, not for a residence, but as a fortress. It was also used for the purpose of receiving tribute from the feudatories within that manorial district, still called the Honor of Clitheroe. Within the walls by which the castle was inclosed, where a handsome house now stands for the bailiff, was a chapel dedicated to St. Michael, which disappeared when the fortress was dismantled in 1649. Prior to this, the Honor of Clitheroe had vested in the crown, and Henry VI., after he was deposed, concealed himself there after the battle of Hexham, but was discovered by the Talbots of Bushall and Colebry, who carried him to London with his legs bound to the stirrups of his horse. The Honor of Clitheroe was, for nearly three centuries, a part of the possessions of the duchy of Lancaster, till Charles II. granted it to General Monk, Duke of Albemarle, from whom it has descended to the present proprietor, the Duke of Buccleuch.

The church of Clitheroe is an ancient structure, with a fine Saxon arch between the nave and choir; it is dedicated to St. Michael, the patron of the castle church. The living is a perpetual curacy under Whalley, of which Earl Howe is patron. Among the monuments of this church is a brass plate to the memory of Dr. John Webster, the astrologer, who obtained celebrity by detecting the impositions of witchcraft in the seventeenth century. One of the incumbents was the Rev. James King, whose son circumnavigated the globe with Captain Cook. The Roman Catholics, the independent dissenters, and the methodists, have places of worship, with Sunday-schools attached, in which nearly 700 children are instructed. Contiguous to the churchyard is a grammar-school, founded and endowed by Philip and Mary in 1554, at the recommendation of Bishop Bridgman, who drew up the statutes. Its concerns are managed by six governors, who appoint the master and usher, subject to the approval of the Bishop of Chester. The income is 452*l.* 8*s.* 8*d.*, arising from the rectorial tithes of the parish of Almondbury, and lands and messuages in Yorkshire. There are twenty scholars, who are educated in the classics, and writing and arithmetic, by whom an annual remuneration is made to the masters, under the name of a cock-penny; besides which fees, the salary of the head master is 200*l.*, and of the under master 100*l.* The rooms of the grammar-school have been used since 1816 as a church Sunday-school, in which 350 children are instructed on the Madras system.

Clitheroe was until recently a place of little trade; but extensive print works and cotton manufactories have been established, which, along with the lime-kilns, find ample employment for the increasing population. The neighbourhood abounds with limestone, for which there is a great demand, as it can now be conveyed by water to any part of the kingdom. The houses of Clitheroe are built of stone, the streets are well paved, and the town is well supplied with water from springs. There has been a weekly market from the time of the Conquest. It is now held on Tuesday, though Saturday is the day for the chartered market. Every alternate week there is a cattle market. Fairs are held March 24 and July 21, for horned cattle and woollen cloth; and the fourth Saturday after Michaelmas-day for cattle, horses and woollens. (*Communication from Lancashire.*)

CLITHON. [NERITIDÆ.]

CLITUS, or CLEITUS. [ALEXANDER III.]

CLIVE, ROBERT, LORD, was born on the 29th of September, 1725, at Styche, near Market Drayton, Shropshire. His family was respectable, but poor. He was sent to several schools, but distinguished himself in all of them rather by a love of mischief and a fearless disposition than by any aptitude or love for learning. He was sent to India, and arrived at Madras, in the civil service, as a writer, in 1744. Three years after he quitted the civil service of the Company for the military, which suited him much better. In 1748 he distinguished himself at the siege of Pondicherry, and shortly after at the taking of Devi-Cotta, in Tanjore, on which occasion his superior officer recommended him to the notice of the Company and British government. Coming into contact with the French (with whom, and not with the natives of India, the main struggle lay) he beat them under their veteran commanders. The taking of Arcot, and the decisive victory gained by the British there, were chiefly owing to this young and comparatively inexperienced officer. On his return to England in 1753 for the recovery of his health, he was highly complimented by the Directory of the East India Company. In 1755 he went again to India as governor of Fort St. David, and with the rank of lieutenant-colonel in the king's service. Soon after his arrival, in conjunction with the naval commanders, Watson and Pocock, he reduced the dangerous pirate Angria, taking Gheriah his capital, and all his treasures. In the meantime the nabob Sujah-u-Dowlah had attacked the British, destroyed their factories, and barbarously thrown part of his prisoners into the memorable 'Black Hole' of Calcutta. Colonel Clive was then, according to the admission of all parties, the main stay and only hope of the British in India. He sailed at once with Admiral Watson to Calcutta, took Fort St. William, in January, 1757, and following up his advantages, thoroughly defeated and disorganized the Sujah's army. Clive's victories led to a peace highly advantageous to the British power in India, which before this event was dwindling to nothing. A series of intrigues and recriminations followed: Clive accused Dowlah of being wholly devoted to the French interests,—as a cruel tyrant over his subjects,—a man without honour, in whom there could be no faith or confidence. On the other side it was urged that Clive, insatiable of power, influence, and wealth, had from the beginning determined to dethrone that Nabob—that with this view he had engaged in intrigues with Meer Jaffier, one of the Nabob's officers, and with Omichund, a Gentoo merchant, whom, it was said, he afterwards defrauded. In all these transactions the observation of the rigid rule of right is not to be expected on either side. Clive's business was to advance the British power in India, and the Nabob happened to be at once an impediment in his way, and a cruel tyrant, after the fashion of that country. The war that ensued was short and brilliant, for, with a 'handful of men,' Clive gained the great victory of Plassey, and, on the next day, entering Murshedabad in triumph, installed Meer Jaffier, who took the style of Jaffier-Ali-Cawn, in the place of Sujah-u-Dowlah. The deposed Nabob was soon taken, and privately put to death by Meer Jaffier's son. The new Nabob gave Clive a jaghire, or grant of land, which was said to produce 27,000*l.* per annum. Clive being made governor of Calcutta, held the chief command there, and through the rest of British Bengal, for about two years.

In 1759 he destroyed a formidable Dutch armament sent against Bengal. In 1760 he returned to England, where he received the unanimous thanks of the Company, and was created by government an Irish Peer, under the title of Lord Clive, Baron of Plassey. He was returned to parliament for Shrewsbury, and kept his seat in the House of Commons till his death. In politics he was rather liberal, being what was then called a 'moderate Whig,'—but he exercised a prodigious influence on parliamentary elections. Speaking of his title of Lord, he says, in a letter to his friend Major Carnac, "If health had not deserted me

on my arrival in England, in all probability I should have been an English Peer instead of an Irish one, with the promise of a red riband. I know I could have bought the title (which is usual), but that I was above, and the honours I have obtained are free and voluntary.'

After Clive's departure, the affairs of India fell into an apparently hopeless state of confusion, and he was once more sent out (in 1764) as the only man at all likely to retrieve them. Before this last employment he received the order of the Bath, and was promoted to the rank of major-general. In spite of dissensions and intrigues, and an almost general opposition on the part of the *employés* of the Company, both civil and military, he set things in order, and gave security to that broad basis on which the British power has been since raised in India. He, however, made many enemies, whose influence he felt a few years later.

He returned from India on the 14th of July, 1767, with a constitution thoroughly shattered. He was received with the greatest distinction. Five years later (in 1772) his proceedings in India were made the subject of severe animadversion in parliament, and out of doors; and in 1773 a select committee of the House of Commons was appointed to examine into them. The charges presented to the House were most serious, involving even a charge of forgery; but on the great debate, on the 22nd of May, the combat was narrowed into a motion made by Colonel Burgoyne, and seconded by Sir William Meredith—'That in the acquisition of his wealth Lord Clive had abused the powers with which he was intrusted.'

This motion was rejected, and, at five o'clock in the morning, a resolution was passed—'That Lord Clive had rendered great and praise-worthy services to his country.' He was thus acquitted, but the course of the trial was a process of torture to his proud spirit, nor was the form of the acquittal altogether satisfactory. He never held up his head again, and towards the end of the following year he committed suicide. Soon after his first arrival in India, in consequence of a painful disorder, he accustomed himself to take opium, the pernicious doses of which he gradually increased. After his last arrival in England, he suffered from a complication of disorders, and, to alleviate the anguish of the gall-stones, he swallowed opium in greater quantities than ever. His death took place on the 22nd of November, 1774, at his house in Berkeley Square, shortly after completing his forty-ninth year. (*Life of Robert Lord Clive, collected from the Family Papers, &c.*, by Major-General Sir John Malcolm, 3 vols. 8vo., 1836.)

CLIVI'NA, a genus of coleopterous insects of the family Scaritidæ, and section Geodephaga. The technical characters are:—body elongate, somewhat cylindrical; antennæ moniliform, the basal joints rather long (the first longest), the remaining joints short and rounded; palpi with the terminal joint long and pointed; mentum trilobate; thorax nearly square; anterior tibiæ broad and compressed, with two notches externally, leaving three long, pointed, tooth-like processes; the intermediate pair of legs with one of these external processes on the tibia.

Dejean incorporates with this genus that of Dyschirius, but we think without sufficient reason.

These insects are of small size, and live under stones in damp situations, particularly on the margins of rivers, lakes, &c.; their dentated anterior tibiæ enable them to burrow like the Lamellicorn beetles.

Of the genus Clivina but few species are known. In England there are two; the more common is *Clivina fossor* (or *C. arenaria* of some authors). This species is rather more than three-sixteenths of an inch in length, and of a black or brown colour; the legs, antennæ, and palpi, are reddish. *Clivina collaris*, the other British species, is rather less than the one just described. It is black, and has chesnut-red elytra, sometimes with a black dash on the suture.

The species of the genus Dyschirius is distinguished from those of Clivina principally by their having the thorax globular, the terminal joint of the palpi thicker in proportion, and somewhat securiform. The body is generally shorter in proportion, and more convex, or less cylindrical; they are almost always of a brassy metallic colour, whereas the species of Clivina are black or brown, and without any metallic hue.

Of the genus Dyschirius between twenty and thirty species are known. Their habits are much like those of the genus Clivina, but they are less frequently found under stones, and often make cylindrical burrows in the ground in banks at the margin of rivers or other pieces of water. Upwards of twelve species inhabit this country, the largest of which is scarcely more than one-eighth of an inch in length.

CLOA'CÆ, large arched drains, formed under the streets of some antient Roman cities. The most remarkable were the cloacæ of Rome, large portions of which still remain in excellent repair. These cloacæ are doubtless of high antiquity, and tradition assigns their origin to the time of the first Tarquin (Livy, i. 38). According to Livy (v. 55) the chief subterranean passages originally followed the lines of the streets and public places, but in the hurry of rebuilding the city after the Gallic invasion, the old lines of streets were neglected, and the houses were often built across the drains.

The cloacæ of Rome consisted of several branches, which ran in the low parts between the hills; these branches fell into one very large arched drain, constructed of solid blocks of stone, called the Cloaca Maxima, said to have been built by Tarquinius Superbus (Livy, i. 56), and repaired, in latter times, by Cato the Censor and his colleague in office. A portion of this cloaca is visible near the Arch of Janus. It was formerly continued towards the Tiber, passing by the Corinthian peripteral temple, called the Temple of Vesta, close to which it terminated in the Tiber, at a point believed to be the Pulchrum Littus, so called from the sides of the river having a walled embankment, with steps. The arched drain of the Cloaca Maxima is fifteen feet wide, and thirty high (these dimensions include the masonry); with three arches in contact one within another: in some parts there are raised paths along the sides of the cloaca; and in the walls are stone brackets to support the ends of the waste pipes of the fountains. Niebuhr says that the innermost vault forms a semicircle 18 palms* in width, and of the same height. This vault is inclosed within a second, and this again within a third. The stone employed, called peperino, is a greenish stone with black specks. The blocks are 7½ palms long and 4½ high. The same writer is of opinion that the Cloaca Maxima was only constructed to drain the Velabrum and the valley of the Circus Maximus. (*Hist. of Rome.*) In the year 1742 a part of the Cloaca Maxima was discovered in the Forum, at the depth of thirty feet from the surface, constructed in a similar manner to the part which is seen near the Temple of Janus. (Nardini, p. 210, lib. v., cap. vii., regio viii.) Niebuhr, on the authority of Ficaroni, says it was constructed of travertino stone, and he thinks it of greater antiquity than the peperino construction. The only cloacæ or drains for a city which can be compared with the cloacæ of Rome, are the sewers of London; and no city in the world is better provided with this valuable and healthy convenience.

The maintenance of the Roman cloacæ was originally the business of the censors, but afterwards belonged to the ædiles: Agrippa, during his ædileship, made numerous large cloacæ, of which Pliny (xxxvi. 15) has spoken in terms of unbounded admiration. The emperors created officers called curatores cloacarum. The city of Pompeii had cloacæ on a smaller scale.

The etymology of the word cloaca is doubtful. Festus derives it from the verb *colluo*, 'to wash together,' or 'bring together by washing.' (*Encyclopédie Méthodique*, 'Architecture;' *Plan of Rome*, by the Society for the Diffusion of Useful Knowledge; Nardini's *Rome*.)

CLOCK. [HOROLOGY.]

CLO'DIUS PU'BLIUS, a Roman patrician, the son of Appius, first became notorious by introducing himself, in the disguise of a woman, into Cæsar's house during the celebration of the sacred rites of the Bona Dea. For this offence he was tried, but, by the help of his hirelings and dependents, and by bribing the judices, he was acquitted. (Cicero, *Ep. ad Attic.*, i. 12. 16.) Cicero, who was called to give evidence on this trial, made a very unfavourable statement respecting his character, for which Clodius never forgave him. It was chiefly in order to revenge himself on so formidable an enemy, that Clodius took measures to qualify himself for the office of tribune of the people: with this view he got himself adopted into a plebeian family, though with considerable difficulty, and not without the help of Cæsar and Pompey. No sooner was he elected tribune than he applied all his energies to effect the ruin of Cicero. [CICERO.]

In B.C. 57, when Lentulus had brought before the

* The Roman palm is equal to 8·79 inches.

senate a proposal to recal Cicero from banishment, a day was fixed for taking the sense of the people. Fabricius, one of the tribunes, who favoured the cause of Cicero, endeavoured to possess the place of assembly with armed men, but it had been preoccupied by Clodius. An encounter followed, in which Clodius was victorious, and followed up his advantage by massacring a considerable number of persons. Milo undertook to prosecute him for these outrages, but it was useless to proceed in the regular manner against a man who employed bodies of gladiators in his defence. Milo accordingly provided himself in a similar way, and the two parties had frequent engagements in the streets of Rome. When Cicero was recalled from exile, a question was raised, whether the ground on which his house had stood, and his property, which had been alienated to religious uses, should be restored to him or not. Clodius made a vehement speech against the restoration; but the point being decided in Cicero's favour, enraged Clodius beyond all bounds, and he made an attempt on Cicero's life. He contrived to screen himself from another trial, which he apprehended, by getting himself elected ædile; and no sooner was Milo's tribuneship expired, than he took advantage of the circumstance to prosecute him for acts of violence. Cicero appeared in defence of Milo, who was acquitted. In B.C. 52, Clodius was a candidate for the prætorship. Shortly after, Milo, in his way from Rome to Lanuvium, a distance of about fifteen miles, met Clodius returning from his country seat at Aricia. The meeting appears to have been accidental; but, through the officiousness of a gladiator in Milo's retinue, a fray ensued, in which Clodius received a severe wound. He was carried into an inn at Bovillæ, to be attended to; but Milo, wishing his men to make the most of their victory, Clodius was dragged out of the inn, and killed in the high-road. (Appian, *De Bell.Civ.* ii. 439.) Milo was tried for the murder, and Cicero spoke, though ineffectually, in his defence. Milo withdrew before his condemnation, and retired into exile at Massilia (Marseilles). (Cicero, *Ep. ad Atticum*, *Pro Milone*, *Pro Domo Sua*; Plutarch, *Life of Cicero*.)

CLOGHER, a bishop's see in the archdiocese of Armagh in Ireland. This diocese embraces the greater part of the county of Fermanagh, and the whole of Monaghan, and extends into portions of Donegal, Tyrone, and Louth; its length is 76 miles from N.W. to S.E.; breadth 25 miles from N. to S. It contains 45 parishes, constituting an equal number of benefices, being the only diocese in Ireland in which these divisions coincide. The chapter consists of dean, precentor, chancellor, archdeacon, and five prebendaries. In 1792 there were in this diocese 49 churches of the Establishment. In 1834 the numbers were—churches of the Establishment, 61; Roman Catholic ditto, 81; Presbyterian houses of worship, 32; and other places of Protestant and dissenting worship, 35. In the same year the gross population of the diocese was 399,249; of whom there were 104,359 members of the Established Church; 260,241 Roman Catholics; 34,623 Presbyterians; and 26 Protestant dissenters of other denominations; being in the proportion of 4 Potestants of all denominations to 7½ Roman Catholics nearly. There were at the same time in the diocese 594 daily schools, educating 39,102 young persons, being in the proportion of $9\frac{79}{100}$ per cent. of the entire population under daily instruction, in which respect Clogher stands sixth among the 32 dioceses of Ireland. Of these schools 72 were in connection with the National Board of Education, being in the proportion of 1 to 8¼.

Clogher, from which the bishopric takes its name, is a small town in the barony of Clogher, in the county of Tyrone, so called, it is said, from a golden stone (*Cloch oir*) formerly consulted here for oracular answers by the Druids. It is situated on the Launy, a feeder of the Blackwater, and formerly returned two members to the Irish parliament. The cathedral is the parish church. The bishop's palace, a handsome edifice, with an extensive park, is adjoining.

Saint Patrick is said to have been the first bishop of Clogher, where Jocelyn reports that he founded a see before the erection of the church of Armagh in A.D. 444. Maccartin, the disciple of Patrick, built a cell and monastery here before his death in 506. Prior to this time, Clogher had been the seat of the petty princes of Errigal, a territory which now gives its name to a neighbouring parish. The church was rebuilt A.D. 1041, and again in 1295, by bishop Mathew Mac-Cathasaidh, who enriched it with bells, and various valuables; and again, a century after, by bishop Arthur Mac-Camæil, the former building having been destroyed by fire, together with the cell of Maccartin, the Monastery of the Virgin, two chapels, and thirty-two other houses, including the episcopal court. The first Protestant advanced to this see was Miles Magragh, in 1570: he was afterwards archbishop of Cashel, to which he was translated in the same year, in consequence of the impoverished state of Clogher about this time. The see was afterwards greatly enriched by a grant of the revenues of the abbey of Clogher, annexed to this bishopric by king James I., in whose reign its revenues were returned at the large sum in those days of 700*l.* per annum. Among the names of the more recent bishops of Clogher are those of Spottiswood, Lesly, Boyle, and Doctor Sterne, the munificent founder of the University Printing-house in Dublin.

By the 3rd and 4th Will. IV., c. 37, Clogher, as soon as vacant, becomes united with the archdiocese of Armagh.

(Ware's *Bishops*; Beaufort's *Memoir of a Map of Ireland*; *Reports of Commissioners*.)

CLOGHNAKILTY, a borough town in the barony of East Carberry and county of Cork, in Ireland; situated on a channel about a mile from the harbour of Cloghnakilty, but without navigation for vessels of more than thirty tons. The charter of the corporation, bearing date 5th May, 11th James I., (1613) was procured by Sir Richard Boyle, the first patron of the borough, and in great measure the founder of the town. By the constitution of the corporation, the power to nominate to all offices was vested in the patron, whose representative, the earl of Shannon, accordingly received 15,000*l.* at the union, as compensation for the loss of the franchise, by which the borough had formerly returned two members to the Irish parliament. The principal part of the present town has been built since the year 1790, about which time a rapid improvement took place in trade of all kinds. Previous to this, most articles of consumption were purchased by retail from Cork or Bandon; but the erection of quays and extensive stores, towards the latter end of the last century, created an independent market, and made this part the point of export of heavy goods for the surrounding country. About the same time it became the most frequented linen and yarn market in that district. The manufacture of linen was also carried on to a considerable extent, as well as the brewing business. Like Bandon, in the same district, the town is now declining both in trade and population. Where 600 persons formerly had employment not more than 150 are now at work. The only trade now carried on is a small manufacture of cotton and export of corn.

The sovereign is the nominee of the patron. The recorder and seneschal, the latter with a court having jurisdiction to the amount of 10*l.* Irish, are nominated by him also. The sovereign's court of record is discontinued; but there are petty sessions held here by the county justices, sovereign, and recorder.

The public buildings are, a church, a Roman Catholic chapel, a barrack, a court-house, and a county bridewell. The chapel, erected by subscription, is a handsome building. In 1815 the number of houses was estimated by the Rev. Mr. Townsend at 586, and of inhabitants at 4688. In 1821 the numbers were;—houses inhabited, 640; inhabitants, 4033; which, in 1831, had decreased to, houses 581, inhabitants 3807. In 1834 there were in the parish of Kilgariff, in which Cloghnakilty is situated, 14 schools, educating 823 young persons. Of these schools two were in connection with the Board of National Education. (*Reports of Commissioners*; *Stat. Surv. of Co. Cork*.)

CLOISTER, from the Anglo-Saxon claurꞇꞃ or cluꞃꞇeꞃ, adopted from the Latin *claustrum*, a place inclosed or shut up. The term is more particularly applied to the covered walk or inclosure which was the usual appendage of our antient monasteries, where the religious met to converse and take exercise. In a more general sense, cloister is used for a monastery at large, whether of monks or nuns, the inmates being inclosed or shut up from the world. The German word 'Kloster' retains this original signification.

CLONFERT, a bishop's see in the archdiocese of Tuam, in Ireland. The diocese occupies the S.E. portion of the county of Galway, and extends partially into the borders of Roscommon and King's County, stretching east to west about 30 miles, and north to south about 25 miles. It contains 38 parishes, constituting eleven benefices. The chapter consists of a dean, archdeacon, treasurer, and nine prebendaries. In 1792 there were in Clonfert 10 churches of the Establishment. In 1834 the numbers were—churches of the Establishment, 12; Roman Catholic ditto, 44; and

other places of Protestant and dissenting worship, 5. In the latter year, the gross population of this diocese was 123,848, of whom there were 4,761 members of the Established Church; 119,082 Roman Catholics; 2 Presbyterians, and 3 other Protestant dissenters; being in the proportion of one Protestant of whatever denomination, to 25 Roman Catholics nearly. There were at the same time in the diocese 111 schools, educating 8,656 young persons, being in the proportion of $6\frac{99}{100}$, or very nearly 7 per cent of the entire population under daily instruction, in which respect Clonfert stands twenty-second among the thirty-two dioceses of Ireland, and is on a par with the diocese of Ross. Of these schools, 7 are in connection with the Board of National Education, being in the proportion of one to sixteen.

Clonfert, from which the diocese takes its name, is a vicarage in the barony of Longford, and county of Galway. The name of the place signifies a wonderful den, or place of retirement. It stands on an isolated height surrounded by bogs, midway between Shannon Bridge and Eyrecourt. There is no town nor village of any consequence. The ruins of the old cathedral are still standing. The episcopal house was built in 1640 by Bishop Dawson.

An abbey was founded here by St. Brendan, the fellow-student of St. Brendan of Birr, A. D. 558. In his time, the cathedral, which was formerly famous for its seven altars, was first founded. Monenius, who died 571, during the lifetime of Brendan, was the first bishop. He was celebrated for his piety, and in 1161 his remains were here deposited in a separate shrine. Roland Lynch, who succeeded to this see in 1602, was also bishop of Kilmacduagh, a neighbouring diocese, which has ever since been held in commendam with Clonfert. By the 3rd and 4th of Will. IV., cap. 37, § 121, the united bishopric of Clonfert and Kilmacduagh, as soon as vacant, is to merge into the joint see of Killaloe and Kilfenora.

(Ware's *Bishops*; Beaufort's *Memoir of a Map of Ireland*; *Reports of Commissioners*.)

CLONMEL, the assize town of the county of Tipperary, in Ireland; situated chiefly on the north side of the river Suir, in the barony of Iffa and Offa East, in the county of Tipperary, and partly on Moore and Long Islands in the same river, in the barony of Upperthird and county of Waterford; 108 miles from Dublin; 52° 19′ N. lat., and 7° 43 W. long. The limits fixed by the Boundary Act include only 361 statute acres, comprising the town on the north side of the river with the islands. A population of about 1000 are excluded by the new boundary line, which cuts off many mean cabins in the suburbs.

Clonmel is a place of considerable antiquity. It is said to have been walled by the Danes. Otho de Grandison, who had a grant of Tipperary, and a considerable portion of Cork, was the first English possessor. He founded a Franciscan Friary here, A. D. 1269.

Clonmel, from its situation on the frontiers of the pale, was a convenient station for assembling on any emergency. The town appears to have continued faithful to the crown until the rebellion in favour of Simnel and Warbeck. A disposition to revolt was also manifested by the inhabitants on the death of Queen Elizabeth. On the breaking out of the war in 1641, Clonmel declared for the Roman Catholic cause. Clonmel continued a strong hold of the ultra Roman Catholic interest until the end of the war, and made a good defence against Cromwell, who besieged, and finally took it in 1650. Clonmel was now dismantled, but continued to adhere to the losing party until after the conclusion of the wars of the revolution by the treaty of Limerick. Few antiquities remain: a gate-house at one end of the main street is the only part of the old works standing.

The town is governed under charter of the 5th July, 6th James I. The corporation consists of the mayor, five burgesses, and commonalty; and is one of those subject to the regulation of the 'new rules' of the 25th Charles II. The patronage is in the family of Bagwell. Prior to the passing of the Reform Act, the same family had also the return of the member for the borough. The assizes for the county of Tipperary are held here twice a year; petty sessions for the same county, which do not take cognizance of any matters arising in the town or liberties, are held once a fortnight. The mayor's weekly court has jurisdiction to the amount of 10*l.* Irish. The court, in which the mayor also presides, has unlimited jurisdiction in civil, [illegible] in criminal matters. This court has fallen into disuse from the heavy stamp duty on the admission of attorneys to practise in it. There is no corporation gaol, but a county gaol, house of correction, and marshalsea. The corporation has no criminal jurisdiction. The property of the corporation has been mismanaged. Their estate, of 4800 Irish acres, produces only 416*l.* 13*s.* 11¼*d.* per annum. Many of the leases under which it is at present held have been executed lately, some of them to the patron, at an under value. There are twelve monthly fairs, ten of them the exclusive property of the patron; and markets twice a week. (*Report of Commissioners on Municipal Corporations in Ireland.*)

The present condition and appearance of the town are highly respectable. Southward from the main street, which runs parallel with the river, diverge three streets, leading to as many bridges, two of which are carried over the islands in the Suir. Adjacent to the lowest bridge are the works which supply the town with gas: a house of instruction stands near the upper. There are barracks for a regiment of foot and two troops of horse, a fever hospital, a parish church built in the form of a cross, a Roman Catholic chapel, and a large cotton manufactory. The market-house is strong and well built. The lunatic asylum for the county of Tipperary, opened here in 1833, cost 16,587*l.* 19*s.* 3*d.*, and is calculated for sixty patients. The cost is to be defrayed by fourteen annual instalments by the county. Commissioners, appointed 25th Sept., 1828, under 9 Geo. IV., c. 82, regulate the lighting and watching of the town: for the last seven years gas has been employed. The amount of watching and lighting tax, levied annually, is 753*l.* 14*s.* 8*d.* The streets are paved and cleansed by the corporation. The expense of paving and cleansing for 1833 amounted to 417*l.* 4*s.* 0*d.* For the last fifteen or sixteen years Clonmel has been steadily advancing in prosperity. 'It is,' says Mr. Inglis, 'the great point of export for Tipperary, which is one great granary, as well as for parts of other counties, for it is the first point at which water-carriage commences.' The exports are chiefly corn, bacon, and butter; of the first article from two to three hundred thousand barrels of wheat are annually brought into the town. The flour mills are very numerous and extensive. The family of Grubb, and other members of the Society of Friends, have been chiefly instrumental in bringing the milling trade to its present importance in this district. The bacon trade is also very extensive; 50,000 pigs per season is the average. The butter trade, though large, has lately been somewhat on the decline. Another considerable source of employment is the great posting establishment of Mr. Bianconi, of which Clonmel is the depôt. There are also several breweries, and an extensive distillery in the vicinity; and a large cotton manufactory, which occupies about 200 persons. There is consequently little want of employment; and the town, up to 1821, rapidly increased. Since 1821 the population has been nearly stationary. There are great facilities for building. Limestone, sand, and good quarries are abundant in the immediate vicinity of the town. An improvement of the navigation of the Suir is very desirable.

The borough, as laid down in the Boundary Report for 1831-2, contains 1532 houses; of which 419 are thatched, and 1113 are slated, and 771 have seven windows and upwards; with a population of 12,256, and a probable constituency of 652. The population of the whole town, in 1821, was 1590, consisting of 7272 males and 8318 females: in 1831 the numbers were respectively 6654 and 8480. In 1821 the number of inhabited houses was 2035, and of families 3847: and in 1831 the numbers were respectively 1793 and 2734.

The population of the entire parish of St. Mary, in which Clonmel is situated, was, in 1834, according to the first Report of the commissioners of public instruction, 17,853; of whom there were 1787 members of the Established Church, 15,848 Roman Catholics, 44 Presbyterians, and 206 other Protestant Dissenters. According to the second Report of the same commissioners there were in the same parish, in 1834, 25 daily schools, educating 830 males and 246 females; total, 1172. Of these schools there are two endowed. One is a boarding and day school. The endowment, amounting to 400*l.* Irish annually, is by the families of Mountcashel and Ormond: the other is a parochial school, with a small endowment of 7*l.* Irish per annum. There does not appear to be any free school, except one for ten females, nor are any of the above in connection with the Board of National Education.

(Cox's *History of Ireland*; Carthshaven's *Memoirs*; Inglis's *Ireland in 1834*; *Post Chaise Companion*; *Pub-*

lications of the Irish Record Commissioners; Parliamentary Reports and Papers.)

There is no local history of Clonmel, nor is there any history of the county of Tipperary.

CLONMINES, a decayed borough, situated on a creek in the barony of Shelburne and county of Wexford, in Ireland. It formerly returned two members to the Irish parliament, for the loss of which franchise the earl of Ely and Charles Tottenham, Esq., received 15,000*l*. compensation at the Union. There are now no remains whatever of a town or corporation. (*Reports of Commissioners.*)

CLORO'DIUS. [CRAB.]

CLOSTERI'NUM. [PHYTOZOARIA.]

CLOTAIRE I., the youngest son of Clovis, the conqueror of the Gauls, and of his wife Clotilda. Clovis having divided his territories at his death, A.D. 511, among his four sons, Clotaire became king of Soissons. He joined his brothers in their war against the Burgundians, which ended in the defeat of the Burgundians, and the extinction of the first kingdom of Burgundy, which was divided among the brother kings of the Franks. Clotaire and his brother Childebert, king of Paris, invaded the kingdom of Orleans after the death of their brother Chlodomère, and murdered two of his sons. The third, named Chlodovalde, concealed himself in an hermitage near Paris, where the village of St. Cloud has since risen. After the death of his nephew Theodebert, king of Austrasia, Clotaire took possession of that kingdom also; and after the death of Childebert, Clotaire united in his person the whole monarchy of the Franks, A.D. 558. His natural son, Chranme, having revolted against him, joined the count of Britanny, who maintained his independence against the kings of the Franks. Clotaire defeated his son, and burnt him alive with his family in a hut in which he had taken shelter, A.D. 560. In 562 Clotaire died, and was buried in the church of St. Medard of Soissons. He left four sons, among whom, following the example of his father, he divided the monarchy of the Franks. Caribert was made king of Paris, Gontran king of Orleans and Burgundy, Siegbert king of Metz or Austrasia, and Chilperic king of Soissons.

CLOTAIRE II. was the son of Chilperic, king of Soissons, or of Neustria, and of his wife Fredegonda. His father died, and left him an infant, under the regency of his mother. After many cruel wars, occasioned by the rivalships between Fredegonda and Brunehaut, the wife of Siegbert, king of Austrasia, Clotaire united in his person the whole empire of the Franks, as his grandfather Clotaire I. had done before him, A.D. 613. Having taken Brunehaut prisoner, he put her to a cruel death. Clotaire, in order to conciliate his new subjects of the kingdoms of Burgundy and Austrasia, appointed a Maire du Palais, Major Domus Regiæ, to each, for life. The office previously seems to have been held, as well as in Neustria, during pleasure only. The Maires of Austrasia, in the following reigns, became by degrees independent of the sovereign, and at last usurped the supreme power. At the council of Paris, A.D. 615, Clotaire issued general ordinances, which were called 'Capitularia.' He also convoked at times a kind of temporary parliament (so called from the word *parlié*, or *parler*, 'to speak'), which was an assembly of the chief officers of the Franks. The bishops had not admission into these assemblies till the time of Pepin, the father of Charlemagne. (*Histoire du Parlement de Paris.*) These parliaments were also called 'Placita,' from which term are derived the words *plaids* and *plaider*, 'to plead.' Clotaire had to sustain a war in his German dominions beyond the Rhine against the Saxons, whom he defeated with the loss of their king, A.D. 626. In 628 Clotaire died, aged forty-five years, and was buried at Paris in the church of St. Germain des Prez. His son Dagobert, who succeeded him, gave to his brother Caribert part of Aquitania with Toulouse for his residence. Clotaire II. was a man of abilities and of considerable information for his time: he was brave and popular, but ambitious, unprincipled, and cruel, like most of the Merovingian kings. (Velly, *Histoire de France sous la Première Dynastie.*)

CLOTHO, a genus of fossil bivalve shells, established by Faujas de Saint Fond for a species found in the shells of CYPRICARDIÆ. *Shell* oval, subregular, striated longitudinally, equivalve, subequilateral. *Hinge* formed by a bifid tooth, curved into a hook, a little larger in one valve than in the other. *Ligament* external.

CLOTILDE, MARGUERITE ELEONORE, born at Vallon Chalis, in the Vivarais, on the banks of the Ardeche, about [illegible], married Bérenger de Surville, who soon joined the army of the dauphin, afterwards Charles VII., and was killed at the siege of Orléans. During his absence Clotilde is said to have composed and addressed to him her first epistle, which she called 'Héroide,' in imitation of Ovid's compositions of the same name. She afterwards, during her long widowhood, is said to have composed the other poems which bear her name. They consist chiefly of ballads, rondeaux, chansons, epistles, with fragments of an epic poem. The last in date is a chant royal, on the occasion of the battle of Fornovo gained by Charles VIII. But the authenticity of these compositions is very much doubted. It rests merely on the reported assertion of Joseph Etienne de Surville, a descendant of Bérenger, and an officer in the royal army, who emigrated at the time of the French revolution, but who having re-entered France in 1798 was tried and executed. He is said to have discovered Clotilde's autograph MSS. among the family papers, which however were all destroyed at the time when the peasantry went about burning the mansions of the nobility. He entrusted some friends with a copy of the poems, which were first published by Vanderbourg in 1803, with a biography of Clotilde. For the controversy about their authenticity, see *Biographie Universelle*, art. 'Surville' (Clotilde), and the authorities referred to; among others, Raynouard's article in the *Journal des Savans*, July, 1824. The poems are not without merit; and if not written by Clotilde they are a very clever imitation of the old French style of the fifteenth century, although some of the images and expressions appear to betray a later origin. Clotilde is said to have died at a very advanced age. (Biography, prefaced to Vanderbourg's edition).

CLOUD, a mass of vapour or other substance not a necessary constituent of the atmosphere, elevated to a considerable height in it. When very near the surface of the earth, it takes the name of mist; or rather, perhaps we should say, it is presumed as a probable hypothesis that the substances called cloud and mist differ only in position.

Our knowledge of cloud, as long as it is *cloud*, must necessarily be small, though the consideration of the phenomena connected with the appearance and disappearance of clouds, their formation and consequences, is an important, and we may now say an extensive, branch of Meteorology. Writers on this last-named subject do not treat much of clouds, except in connexion with other phenomena, rain, thunder, &c., and we may therefore refer to other articles for the most important facts.

In its permanent state, a cloud is conjectured to be a mass of *vesicular vapour*, that is to say, a collection of minute watery globules filled with air. A mass of vapour, in the strict sense of the term, could not be maintained *in equilibrio* when isolated in the air in the manner of a cloud. But even the preceding explanation is not without its difficulties. The globules (if full of air) must be specifically heavier than air, and it is not easy to see how they can maintain their position. The ascent of currents of heated air, and the retention of solar heat, have been suggested: but we shall content ourselves with the remark of M. Pouillet, that our *data* on this subject are too few to render any attempt at explanation advisable; and that we have nothing but more or less probable conjectures as to the causes which determine the form, the extent, the elevation, colour, &c., of these masses.

The motion of the clouds, though frequently depending on that of the wind, and sometimes proving the existence of a counter-current in the higher regions of the atmosphere, is nevertheless often caused by an action of one mass upon another, which there is every reason to attribute to the difference of their electrical states. Here we have again a branch of meteorology which is yet only beginning. The conjectures relative to weather, formed by observation of the state of clouds, will require a long course of observation before the truth can be separated from fiction. That many persons who are in the habit of observing, and seamen in particular, do acquire a sort of power of prediction which frequently is correct, cannot be denied; but if we except perhaps the general fact, in which all the world is agreed, namely, that collection of clouds promises rain and dispersion fair weather, there are no rules in which even continual observers are agreed.

The height of the clouds varies to upwards of a mile, being much more frequently less than more. Mr. Dalton however asserts that small fleecy patches of cloud are frequently from three to five miles in height. The average height varies at different periods of the year. The following observation (and if the subject had been often

studied in this way, we could perhaps have written more definitely upon it) is given by Mr. Dalton in the first edition of his Meteorological Essays (1793), the observer being Mr. Crosthwaite of Keswick. By accurate measurement of Skiddaw, and fixing marks on the side of the mountain, which is 1050 yards high, he was able to ascertain by inspection the height of any cloud, when it did not exceed that of the mountain.

This he did three times each day, morning, noon, and evening, for five years, missing only as many observations as amounted to omitting less than a week per year. The result is as follows, the last column giving the number of times in which either the clouds were above the mountain, or there were no clouds at all, the last circumstance occurring about once out of thirty times.

Month.	0— 100 yards	100— 200 ,,	200— 300 ,,	300— 400 ,,	400— 500 ,,	500— 600 ,,	600— 700 ,,	700— 800 ,,	800— 900 ,,	900—1000 ,,	1000—1050 ,,	Above 1050 ,,	Number of Obs.
Jan. .	0	9	12	24	53	39	37	32	30	39	36	116	431
Feb. .	5	10	5	15	41	45	45	27	43	38	29	94	397
Mar. .	2	1	6	11	22	40	32	36	24	32	44	181	434
Apr. .	0	4	5	18	21	34	37	26	23	38	35	206	450
May .	0	1	4	8	13	31	22	25	30	34	27	270	465
June .	0	2	2	6	24	24	29	21	34	41	34	233	450
July .	0	2	2	18	35	36	35	25	35	48	38	191	465
Aug. .	0	4	5	13	27	39	35	26	25	45	30	215	464
Sep. .	0	1	7	13	38	38	32	30	27	51	27	186	450
Oct. .	2	0	5	13	26	49	31	31	46	61	37	164	465
Nov .	0	0	3	13	30	58	42	39	46	45	47	128	450
Dec. .	1	8	6	23	41	53	39	50	47	46	35	111	460
Total .	10	42	62	179	371	486	416	367	410	518	409	2098	5381

Thus, it appears, that in the month of September, for instance, for seven times that the clouds were between 200 and 300 yards high, there were 38 times in which they were between 500 and 600 yards high, &c. The supposition of the height of the clouds depending on the barometer, was in no degree countenanced by these observations, and though in heavy and continued rains the clouds were mostly below the summit, yet it frequently rained when they were above it.

The most complete classification of clouds, and sketch of their usual forms and arrangements, is to be found in a paper by Mr. Luke Howard, first published in Tilloch's Magazine, then in Rees's Cyclopædia, afterwards in Nicholson's 'Journal of Natural Philosophy,' &c., vol. xxx. p. 35. In this paper Mr. Howard first proposed the nomenclature which is now so frequently used, and of which we give the heads in his own words.

1. *Cirrus*. A cloud resembling a lock of hair, or a feather. Parallel, flexuous, or diverging fibres, unlimited in the direction of their increase.

2. *Cumulus*. A cloud which increases from above in dense, convex, or conical heaps.

3. *Stratus*. An extended continuous level sheet of cloud, increasing from beneath.

4. *Cirro cumulus*. A connected system of small roundish clouds, placed in close order or contact.

5. *Cirro-stratus*. A horizontal or slightly inclined sheet, attenuated at its circumference, concave downward, or undulated. Groups or patches having these characters.

6. *Cumulo-stratus*. A cloud in which the structure of the cumulus is mixed with that of the cirro-stratus, or cirro-cumulus. The cumulus flattened at too, and overhanging its base.

7. *Nimbus*. A dense cloud spreading out into a crown of cirrus, and passing beneath into a shower.

CLOUD, ST., a small town in the immediate neighbourhood west of Paris. It lies on the left bank of the Seine, not far from Sèvres; the road to it is a branch from the great road by Sèvres to Versailles. It is in the department of Seine et Oise.

This place is said to have been known, in the earlier ages of the Frankish monarchy, by the name of Nogent. Chlodovalde, one of the three sons of Chlodomère, king of Orléans, retired hither in the sixth century, having embraced a monastic life to avoid the fury of his uncles Childebert and Chlothachaire or Clotaire, who had (A.D.533) murdered his two brothers in order to seize their inheritance. This prince was canonized, and his name, corrupted into St. Cloud, has been given to the town where he passed his life and where he was buried.

The claims of this place to notice are founded upon its park and palace, the favourite residence of Napoleon, and now the usual summer residence of the king of the French. Within the limits of this park was formerly a château belonging to a Florentine, Jerome de Gondi, in which Henry III. of France took up his quarters during the siege of Paris by his own forces and those of Henry IV., the king of Navarre. Here he was killed, A.D. 1589, by the monk Jacques or James Clément. The heart of the unfortunate prince was deposited in the parish church of St. Cloud, with this inscription, 'Passenger, pity the lot of kings!' The church, which had long been in a decayed condition, was demolished a little before the revolution by the queen Marie Antoinette, who commenced the erection of a new one at her own cost: but the breaking out of the revolution put a stop to it. The domain with an adjacent one was purchased by Louis XIV., and given to his brother the duke of Orléans. The present palace, built by the duke, has engaged the talents of several architects, among whom is Mansard. It was purchased a little before the revolution by Marie Antoinette, who much enlarged it, and rendered it more magnificent. Bonaparte, on his return from Egypt (A.D. 1799), assembled the Council of the Five Hundred in the palace of St. Cloud, and dissolved them by force.

The park of St. Cloud extends from Sèvres to the town of St. Cloud, on a hill which rises above the bank of the Seine. The lower part of the park, along the bank of the river (from which it is separated by a road and towing path), is occupied by a magnificent plantation of elms and by green lawns: it is the part most frequented by those on foot, as being the nearest to Paris, and the most commodious for walking. But the upper part of the park, and the wooded slope of the hill on which it lies, excel the lower part in picturesque beauty. The slope, skilfully planted, is adorned by masses of foliage, by frequent steep declivities, and by pleasant recesses. Down this slope falls the cascade of St. Cloud, the water tumbling from one basin to another carved in the form of shells, and adorned with grotto-work, statues of marble and figures cast in lead: at the bottom of the cascade, the 'giant jet' spouts up a column of water to the height of more than a hundred feet. The upper part of the park has spacious lawns and alleys of trees stretching beyond the reach of the eye, but the turf is not so fresh nor are the trees so vigorous as in the lower part. At the edge of the slope, a platform called 'La Balustrade' commands an extensive view, including the long meanderings of the Seine, the whole extent of the capital, and a considerable part of the surrounding country. From this platform rises a lofty square tower, from the top of which is a prospect still more extensive. This tower was built by Bonaparte A.D. 1801, and on the top of it is a copy of the lantern of Demosthenes.

The château of St. Cloud is equally admired for the beauty of its situation and the elegance of its architecture. It has not indeed the vast magnificence of Versailles, but it is as beautiful with less pretension. It consists of a principal front and two wings at right angles, inclosing three sides of a square, the fourth side of which is formed by a terrace and balustrade, from which there is a view of the park and of the same objects which the platform commands. There are three porticos of the Corinthian order, one in the centre of the principal front, and one at the extremity of each wing; the intervals are adorned with statues and reliefs. The most remarkable parts of the interior are the gallery painted by Mignard, and the room called the 'Salon de Mars,' the ceiling of which was painted by the same artist; but the chief ornament of it is four superb marble columns. The pictures are not numerous, but they are well chosen. The château was much improved and splendidly furnished by Napoleon.

The town of St. Cloud abounds with houses of public entertainment, tea gardens, cafés, &c. The population in 1832 was 1935. There is an annual fair in September, which lasts three weeks, and attracts a number of persons from Paris on the Sundays which fall during its continuance. (Vaysse de Villers.)

CLOUDBERRY, a dwarf kind of bramble, with herbaceous stems, and orange-yellow fruit, found in turfy alpine bogs; it is the *Rubus chamæmorus* of botanists. Its fruit is excellently well flavoured when newly gathered.

CLOVE PINK, a species of Dianthus, so called from a supposed resemblance in odour between its flowers and the cloves of the shops.

CLOVER, a name given to different species of Trifolium. Dutch clover is T. repens; purple clover is T. pratense; cow-grass, or perennial clover is T. medium.

Clover was introduced into the agriculture of Great Britain about the sixteenth century, from the Low Countries, where it had been long cultivated as green food for cattle in situations where natural pastures were scarce. It was the first step towards the improvement of the old triennial system. Its abundant produce, its destruction of annual weeds, which it smothers by its broad foliage, and especially the beauty of the wheat sown after it, soon recommended it as an indispensable part of an improved rotation of crops. It is not too much to say, that the profit of any farm may be considered as proportionate to the quantity of clover which is produced upon it on an average of years. There are various kinds of clover, which all go under the botanical name of trifolium, from the three leaves which grow together, or rather the form of the leaf, which has three heart-shaped parts. They are annual, biennial, or perennial plants. The annual clovers, with the exception of the trifolium incarnatum (*Trèfle incarnat* or *farouche*), introduced from the south of France, are not so generally cultivated as the biennial, which produces a greater crop, and being sown along with the spring corn comes up the first year under its shade, and gives a full crop in the second. In good land it will sometimes stand another year, but it falls off in quantity; and unless other artificial grasses or perennial clovers have been sown amongst it, to fill up the places where the biennial clover has failed, it is seldom profitable to allow it to remain on the ground more than one year after that in which it is sown.

The most approved variety of the biennial clovers is the common red or broad clover (*Trifolium pratense*), which is usually sown with barley or oats, or sometimes among wheat or rye in spring. When these are drilled and hoed there is an advantage in sowing the clover seed among a crop which is already advanced in growth, because it is kept under, and there is no danger of its injuring the chief crop by its too great luxuriance. There is however some risk of the clover not coming up so well, if the wheat or rye is very close on the ground. In Scotland clover is often sown among wheat, in Norfolk invariably with barley, and in Belgium among rye. This depends on the various rotations adopted in different countries. The first crop is generally mown and made into hay. In this process great care is taken not to break off the tender leaves of the plant in drying; the swarth is not shaken out as is done with meadow grass, but merely turned over; and if the clover can be dried and put in a stack without any shaking, it is so much the more valuable. When clover is soaked with rain, no hope of an improvement in the stack must induce the farmer to carry it together, so long as the least moisture remains. If it is allowed to stay in the field till it is perfectly dry, even when it has been soaked repeatedly and is nearly black, and is then trod hard in a rick with a sprinkling of salt over each layer, it will be readily eaten by cattle in winter, and be far more nutritious than that which, having been stacked in a moist state, will infallibly come out musty. A very good method in those seasons when a continuance of dry weather cannot be reckoned upon—particularly when the second crop is cut in September—is to take advantage of two or three dry days to cut the clover, and turn it as soon as the dew is completely dried off the upper side; the next day do the same, and in the evening carry the green dry clover and lay it in alternate layers with sweet straw, so as to form a moderately sized stack. A fermentation will soon arise, but the dry straw will prevent all danger from too much heating, and, acquiring the flavour of the clover, will be eaten with avidity by the cattle. To those who make clover-hay for the use of their own stock in winter, we recommend this as preferable to the common method, even when there is less danger from the weather. In northern climates it would probably save the crop two years out of three.

It is usual to sow rye-grass (*Lolium perenne*) in a small proportion with clover seed, especially where clover, having been often repeated on the same land, is apt to fail. It is a good practice; and although in the neighbourhood of London the unmixed clover obtains a better price, there is no reason why it should be preferred, unless the rye-grass has been allowed to stand too long and has grown hard. Young rye-grass is a good corrective of the heating qualities of clover-hay. A very extensive use of clover-hay in London is to cut it into chaff, and to mix this with oats and beans for dray horses, which have little or no hay given them in any other way; but the most profitable use of clover is to cut it green for horses and cattle. With a little management and the assistance of tares, green food may be given to all the stock from the first day of May to the end of November.

The land which has borne clover, although in a very good state for producing corn, will not bear a repetition of that crop until several other crops have intervened. In the regular Norfolk rotation, clover should recur every fourth year; but after a few rotations this is found to be too quick a recurrence, and other grass seeds or pulse are substituted. The Flemish do not sow clover again on the same ground sooner than in eight or ten years.

The white or Dutch clover (*Trifolium repens*) is a perennial, which grows rapidly, and forms excellent pasture; but its bulk is not sufficient to make it profitable to mow it for hay. It is excellent for sheep, which thrive well upon it. A light calcareous soil is best adapted for white clover; but it also grows well on heavy land, provided the bottom be sound and dry. When land is laid down for permanent pasture, white clover is always sown in a considerable proportion with other grasses.

Another perennial clover, called cow grass (*Trifolium medium*), is found in all rich meadows: it is often sown in conjunction with the white clover in laying down arable land to grass. The lesser yellow trefoil (*Trifolium minus*) and the hop trefoil (*Trifolium procumbens*) are also valuable varieties found in good pastures.

The only annual clover which is cultivated is the French clover (*Trifolium incarnatum*), mentioned before. It is a most valuable addition to the plants usually sown for fodder, from the short time in which it arrives at perfection if sown in spring; so that where clover has failed, this may be sown to fill up the bare places. Its principal use is to raise very early food for ewes and lambs, which it does with very little trouble or expense. Immediately after harvest the stubble is scarified and harrowed so as to raise a mould; the Trifolium is sown at the rate of 16 to 20 lbs. per acre, and well rolled in. It springs up and stands the winter well, and with the first genial weather in spring it grows rapidly. It makes excellent hay, and what is left produces seed most abundantly in the end of May or beginning of June, being off the ground in good time to plough the land and clean it for turnips. It is far superior to stubble turnips as an intervening crop, and more rapid in its growth than tares. On light land a crop of buckwheat is readily obtained after it. It has the property of smothering annual weeds by its rapid growth, and for this reason is not so well adapted for sowing with a crop of corn. The Italian rye-grass (*Lolium perenne Italicum*) may be sown with it, and will grow as rapidly. After the Trifolium has been cut, this will continue and give an excellent second crop. It is advisable to have fresh seeds from southern climates from time to time, or it will probably become later every year by assimilation to the climate. English seed of the first year after importation seems the best, being heavier and more free from weeds than the foreign.

Some agriculturists have objected to the practice of sowing clover with a crop of corn; they prefer hoeing the intervals between the rows of the drilled crops, by which the weeds are better kept down. They plough the land immediately after harvest, and harrowing it well, they sow clover and grass seeds, which come in nearly as soon the next year as if they had been sown in the preceding spring; and the land, when broken up, is in a much cleaner state than if the clover had been sown with the corn. If this be not an improvement in the system, it is at least worthy of notice, and experience alone can decide whether the additional expense of ploughing is repaid by the improvement in the crop.

In France and in the United States of North America gypsum is considered as a specific manure for clover. It is sown by hand over the plant in spring, and in some situations the advantage is evident, in others scarcely observable. The quantity used is from three to eight bushels of finely powdered gypsum per acre.

On good land an acre of clover will produce as much as three tons and a half of dry hay; that is, two tons the first cutting, and one and a half the second. Greater crops are obtained on very highly manured land. The value of a ton of clover-hay to feed horses with is about 15 or 20 per cent. more than good meadow-hay. It is not however so good for milch cows. The price in London is from 4*l.* to 5*l.* per ton on an average.

When clover is intended to be left to ripen its seeds, it

should be mown early, or fed off by sheep in May. The first crop is seldom free from various seeds of other plants which rise among the clover: by feeding it down or mowing it these are destroyed, and the clover, which grows more rapidly than most other plants, rises again without any mixture of weeds. When the blossom is thoroughly withered, and the seed is nearly ripe, the clover is mown and left to dry on the ground without much shaking. In very dry weather it may be housed or stacked in a week; but the process is much retarded by showers and want of sunshine. It is therefore only in the drier parts of the island that clover seed repays the expense and risk of cultivation, especially as it is well known that the subsequent crop suffers if the clover is allowed to stand for seed. It is seldom therefore that more seed is saved, even in the most favourable situations and seasons, than is required for the farm or immediate neighbourhood. The demand from the North, where clover is sown to a great extent, could not be supplied without a considerable importation from abroad: and this has caused an outcry against the duty of 20*s.* per cwt. on foreign seed, as a tax on agriculture. Notwithstanding this high duty, the importation of clover-seed from Belgium and Holland is very considerable, as it is more advantageous to purchase foreign seed than to raise it; except in the case of the *Trifolium incarnatum*, which produces early and abundant seed. Foreign clover-seed should be well examined when it is purchased, as it frequently contains the seeds of docks and other noxious weeds. The usual mode of doing this is very simple. The thumb is moistened and pressed on the sample, some of the seeds adhere, and when it is turned up the quality is distinctly seen by the colour and plumpness of the seeds. If any seeds of weeds are in it, they must be detected after a few insertions of the thumb. As the calyx of the flower of clover envelops the seed closely, it is difficult to separate them. In Holland they have various machines for this purpose, one of which consists of two fine-rodded hurdles made to rub on each other whilst the heads pass between them. In England it is generally threshed on the floor. But if the heads, after being separated from the haulm, are put together in a heap and pressed, a slight fermentation takes place, and this makes the calyx brittle, so that it breaks into dust, and the seed comes out readily; it is then easily cleared by the fan.

When the seed is not intended for the market, the trouble of clearing it of the husk may be saved, especially in the *Trifolium incarnatum*. It will grow as well when sown with the husk as when cleaned; and it is easy to find the proportion required to be sown in that state by allowing for the weight of the husk.

CLOVES, the dried flower buds of Caryophyllus aromaticus.

CLOVIS, CLODOVEUS, and CHLODWIG in old German, from whence Ludwig, the Latinized form Ludovicus, and Louis are derived, was born A.D. 467. He was the son of Childeric, and grandson of Merowig, who gave his name to the Merovingian dynasty. Tournay was then the capital of the Salian Franks, who had occupied the north-east part of Gaul, and extended their incursions as far as Paris. After the death of Childeric, A.D. 481, Clovis attacked Siagrius, the Roman commander, defeated him near Soissons, took him prisoner, and beheaded him. Having conquered the whole country, south and west, as far as the Seine, he fixed his residence at Soissons. He afterwards got rid, by force or treachery, of the other Frankish chiefs, his own relatives, who held various parts of North Gaul: Siegbert, king of Cologne, Cararic, king of the Morini, Ranacarius, king of Cambrai, and others, all perished by his hand.

In 493 Clovis married Clotilda, the daughter of Chilperic, king of the Burgundians, who was a Christian. Clovis and most of the Franks were still Pagans. In 496 Clovis fought a great battle at Tolbiac, near Cologne, against the Alemanni, who had advanced to the Rhine and threatened Gaul. In the most critical moment of the fight, it is said that he made a vow to acknowledge the God of Clotilda if he remained conqueror. The Alemanni were completely defeated, and Clovis and most of his soldiers were christened on Christmas day of the same year, by Remi, archbishop of Rheims. The Gauls and Romans of the western provinces, as far as the mouth of the Loire, submitted voluntarily to Clovis.

He next turned his arms against Alaric II., king of the Visigoths, in the south-west part of Gaul, whom he defeated in the battle of Vouilli, near Poictiers, A.D. 507; Alaric fell, and Clovis took possession of the whole country as far as the Pyrenees. Theodoric, king of the Goths in Italy, coming to the assistance of his countrymen, defeated Clovis near Arles, 509, after which peace was made between the Goths and the Franks. Anastasius I., emperor of Constantinople, bestowed upon Clovis the titles of Patrician and Augustus, and sent him a crown of gold and a mantle of purple, A.D. 510. Clovis now fixed his residence at Paris. In 511, at the Council of Orleans, the rights called Regalia were acknowledged by the bishops as vested in the kings of the Franks. By these rights, on every vacancy of a See, the revenues devolved on the king, who had the right of nomination. Clovis caused the laws and customs of the Salian Franks to be compiled and arranged to serve as a code for his Frankish subjects. His Gaulish and Roman subjects were subject to the Theodosian Code. In 511 Clovis died at Paris, after a reign of 30 years, and was buried in the Church of St. Peter and Paul, afterwards called Sainte Geneviève. When the old church of Sainte Genevieve was pulled down on May 10, 1807, two sarcophagi of stone were found with the remains of Clovis and his wife Clotilda, as well as an epitaph upon the former, written long after his death. They are preserved in the 'Musée des Monumens Français,' as well as a statue of Clovis, erected to his memory by King Robert, towards the beginning of the 11th century. Clovis left four sons, among whom he divided his monarchy. [CLOTAIRE I.] Clovis first reduced the Franks to the condition of a united and partly civilized nation. His conversion to Christianity conciliated the clergy as well as his Roman and Gaulish subjects, most of whom had embraced that faith.

CLOYNE, a Bishop's see, in the archdiocese of Cashel, in Ireland. The chapter consists of a dean, chanter, chancellor, treasurer, archdeacon, and fourteen prebendaries. The diocese occupies the greater part of the county of Cork, from the river Lee northward, and lies wholly within this county, with the exception of a part of one parish, which is in the county of Waterford. It extends from E. to W. 63 miles, and from N. to S. 29 miles. In 1792 the number of parishes was 137, and of benefices 69, with 51 churches of the Establishment. It now contains 122 parishes, constituting 81 benefices. In 1834 the places of worship were—churches of the Establishment, 64; Roman Catholic ditto, 89; other places of Protestant and Dissenting worship, 30. In the same year the gross population of this diocese was 342,477; of whom there were 13,866 members of the Established Church: 328,402 Roman Catholics; 14 Presbyterians; and 195 other Protestant Dissenters; being in the proportion of one Protestant of whatever denomination to 23½ Roman Catholics nearly. There were at the same time in this diocese 379 daily schools, educating 21,043 young persons; being in the proportion of $6\frac{14}{100}$ per cent. of the entire population under daily instruction, in which respect Cloyne is on a par with Kilfenora, and stands 25th among the 32 dioceses of Ireland. Of these schools, 19 were in connection with the Board of National Education, being in the proportion of 1 to 20 nearly.

Cloyne, from which the bishopric takes its name, is a vicarage and small town in the barony of Imokilly, and county of Cork. The name may signify a place of retirement: by some it is derived from cluaine, a cave, from the number of caves with which the limestone strata of Imokilly abound. The chief object of interest here is a round tower, 92 feet in height, surmounted by a modern battlement, the original conical roof having been destroyed by lightning in 1749. East of the round tower, on the opposite side of the street, stands the cathedral, a small heavy building, supposed to have been raised about the end of the thirteenth century. The episcopal palace adjoins the town; it is a plain mansion, built in the early part of the last century by Bishop Crowe, and stands in a handsome demesne. The town itself is an inconsiderable place, consisting of one principal street of mean houses. It was estimated in 1800 to contain 308 houses, and rather more than 1600 inhabitants. The number of inhabitants is now about 2000. Being the only market-town in a considerable extent of country, its fairs are usually well attended. In 1834 there were in Cloyne 8 schools, educating 556 young persons: of these schools there was one endowed, and one a free-school.

The founder of the bishopric was Colman, son of Lenin, the chief bard of Aedh, king of Munster. He died A.D. 604. There are few records of the see prior to the arrival of the English, about which time one Mathew was

bishop; he is supposed to have been the same with the then legate of Ireland. About the year 1327 this see had become so impoverished, that king Edward III. wrote to Pope John XXII. for the purpose of uniting it with the diocese of Cork, also at that time much reduced: but the contemplated union did not take place till more than a century after, when, both sees happening to be vacant, they were consolidated by Pope Martin V. in the person of Bishop Jordan, about A.D. 1430.

About the time of the Reformation, this see, in common with almost every other diocese in Ireland, had suffered severely in its temporalities, part being forcibly seized on by lawless neighbours, and part being fraudulently made away with by lay prebends and dishonest bishops, insomuch that, says Harris, 'there was not one bishopric in the province of Cashel that had not the print of the sacrilegious paw upon it; and on some of them *vestigia nulla retrorsum*.' To so low a state was Cloyne reduced at this time, that the bishop of it was called '*Episcopus quinque marcarum*,' five marks being the whole of its annual revenue.

Cork and Cloyne continued united until, in 1638, Doctor George Synge was consecrated Bishop of Cloyne, separately, by Usher, at Drogheda. Bishop Synge dying in 1653, the see was vacant until, on the cessation of the civil wars in 1660, it was bestowed on Michael Boyle, who held it again united with Cork, and also with Ross, as did his next successor, Bishop Edward Synge, since whose death in 1678 these sees have been in separate hands. Bishop Crewe, one of his successors, in 1702 recovered to the see upwards of 5000 Irish acres of land which had been fraudulently conveyed away by some of his predecessors; he was besides a munificent benefactor to the town, in which he founded a free-school, at present enjoying 190*l.* 8*s.* per annum, and educating 35 boys by his bequest.

Among the distinguished prelates of the see are the names of Berkeley, and the late Bishop Brinkeley.

By the 3rd and 4th Wm. IV., c. 37, sec. 121, Cloyne is to be reunited to Cork and Ross as soon as these latter sees become void.

(Ware's *Bishops*: Beaufort's *Memoir of a Map of Ireland*; *Reports of Commissioners*; Croker's *Sketches in the South of Ireland*.)

CLUB is defined by Johnson to be 'an assembly of good fellows, meeting under certain conditions;' but by Todd, 'an association of persons subjected to particular rules.' It is plain that the latter definition is at least not that of a club as distinguished from any other kind of association, although it may not be more comprehensive than is necessary to take in all the associations that in modern times have assumed the name of clubs. Johnson's however is the more exact account of the true old English club.

It might not be quite safe to make a positive assertion as to the antiquity either of the name or the thing in England. But the earliest clubs remembered in our popular literature date about the end of the sixteenth or the beginning of the seventeenth century. It was then that there was established the famous club at the Mermaid Tavern, in Friday Street, of which Shakspeare, Beaumont, Fletcher, Raleigh, Selden, Donne, &c., were members.

Ben Jonson had another club, of which he appears to have been the founder, that met at another well-known tavern, called the Devil Tavern. It stood between the Temple Gates and Temple Bar. It was for this club that Jonson wrote the 'Leges Convivales,' which are printed among his works.

It seems to have been not till a considerable time after this that political clubs first came into vogue.

In the 'Spectator,' No. 78, Addison makes mention of 'the club, or rather the confederacy, of the Kings.' 'This grand alliance,' he observes, 'was formed a little after the return of King Charles II., and admitted into it men of all qualities and professions, provided they agreed in this surname of King, which, as they imagined, sufficiently declared the owners of it to be altogether untainted with republican and anti-monarchical principles.' A famous political club of those days was the King's Head Club, which is alluded to in Tate's continuation of Dryden's 'Absalom and Ahithophel.' It was a whig club; and the badge of its members was a green riband, in opposition to the tories, who wore a scarlet riband in their hats. (See Dryden's Works, by Scott, vol. vii., p. 154, and vol. ix., p. 380.)

The great age of clubs, political, literary, and of every other description, was the early part of the last century. Then flourished, among many others, the Brothers' Club, in which were associated Harley, Bolingbroke, Swift, and the other most distinguished literary and political characters of the day: the famous Scriblerus Club, of which Pope, Swift, and Arbuthnot were the leading members: the October Club, of the original institution and subsequent history of which an account may be found in Swift's 'Four last Years of the Reign of Queen Anne,' and also in a satirical pamphlet entitled 'The Secret History of the October Club, from its original to this time, by a Member,' 8vo., London, 1711: the Hanoverian Club: the first Beef-Steak Club, of which Mrs. Woffington, the actress, was president, being the only female member, and Richard Estcourt, the comedian, provisor, wearing in that character a small gridiron of gold, hung round his neck with a green silk riband: and, above all, the celebrated Kit-Cat Club, which is said indeed to have been instituted at the time of the trial of the seven bishops, in the reign of James II., but was in its greatest glory in that of Queen Anne.

In 1735 the second Beef-Steak Club, being that which still exists, and which has embraced among its members the most eminent public characters that have appeared since its institution, originated with Rich, the pantomimist, and the Earl of Peterborough. For an account of the circumstances, see an entertaining work entitled *The Clubs of London*, 2 vols., 8vo., London, 1828.

Of clubs of more recent institution, the most famous is the Literary Club, established in the year 1764, of which Johnson, Boswell, Burke, Reynolds, Goldsmith, and other well-known names, formed the list of members. Along with this may be mentioned the Essex Head Club, also founded a few years after by Johnson. It took its name from the tavern at which it met, in Essex Street. One of the most successful literary clubs of modern times was that call d the King of Clubs, which began about the year 1801, and used to meet at the Crown and Anchor, in the Strand. An account of it is given in the second volume of the 'Clubs of London.'

The modern subscription houses which go by the name of clubs, such as the Athenæum, the University, the Senior and Junior United Service, and others of the same description, are in no other respect clubs, according to the antient English understanding of the term, except that every member must be balloted for, or admitted by the consent of the rest. And little more of the true character of a club belongs to those numerous political associations known as the Whig Club of Brookes's, the club at White's, the Carlton Club, &c. Political associations, in imitation of those existing in England, were formed at Paris in the earliest stage of the French revolution, and assumed the English name of clubs. The Breton Club, the Jacobin Club, the Club des Feuillans, and others, performed an important part in the various scenes of that extraordinary drama.

CLUB-MOSS, or SNAKE-MOSS, is a prostrate moss-like plant, with small scaly imbricated leaves, found in alpine or damp situations in most parts of the world. Its fructification consists of little two valved cases, containing powdery matter. All the species belong to the genus Lycopodium; that to which the name is most commonly applied is L. clavatum.

CLUNY, a town in France, in the department of Saône et Loire; it is on the little river Grône, in a by-road, 200 miles in a direct line S.S.E. of Paris, in 46° 26′ N. lat., and 4° 39′ E. long.

Until the early part of the tenth century, Cluny was a mere village in the Mâconnois. In 910 Guillaume (William) I., duke of Aquitaine and count of Auvergne, who had purchased the village, founded an abbey of the Benedictine order. About twenty years afterwards St. Odon, second abbot of Cluny, introduced a reform into the Benedictine order, which reform spread very widely; and in course of time two thousand religious houses adopted the discipline of Cluny, which alone of those in which the rule was observed retained the rank of an abbey; the others were all simple priories, the abbots laying aside their title and rank. The Cluniac monks were divided into reformed and non-reformed, and the abbot of Cluny was the recognised superior of the whole order. The abbey was very extensive, and the number of the religious in the middle ages very large. The increase of the establishment may be judged of by the

fact, that when, in A.D. 1245, Pope Innocent IV., accompanied by twelve cardinals, a patriarch, three archbishops, the two generals of the Carthusians and Cistertians [CHARTREUSE, CITEAUX], and the king of France (St. Louis) and three of his sons, the Queen Mother, Baudouin, count of Flanders and emperor of Constantinople, the duke of Bourgogne and six lords, visited the abbey, the whole party, ecclesiastical, royal, and noble, were lodged in the building of the monastery without disarranging the order of the monks, who amounted to four hundred. The abbot had the disposal of a great number of benefices, and of the priories of the different houses of the order. His archdeacon exercised all the functions of a bishop in the three parishes of the town of Cluny, except those of confirmation and ordination, until 1744, when the episcopal jurisdiction was transferred to the bishop of Mâcon. The revenues of the abbot were stated by Expilly (1762) at 50,000 livres (about 2000*l.*) at least, and the revenue of the establishment (*la mense conventuelle*) at 70,000 livres (nearly 3000*l.*). The church of the monastery was one of the largest in the kingdom, built in the form of a cross, above 600 feet in length. The monastery was three times plundered by the Huguenots: before the last pillage the library contained 1800 manuscripts, and even after this event it was one of the richest in France; but it was dispersed or transferred elsewhere at the revolution, and the church destroyed. The monastery itself, a handsome modern building, has been appropriated to several public establishments, among which is a college or high school.

The town of Cluny is in a valley; it occupies as much ground as Mâcon, though far less populous. There is a stone bridge over the Grône, and before the revolution there was one religious establishment, besides the abbey, and two hospitals, one for the poor and one for the sick. The inhabitants in 1832 amounted to 3368 for the town, or 4152 for the whole commune: they manufacture coarse woollens, articles of furriery, and gloves; they trade in corn, wine, leather, and wicker-work. The valley affords pasturage, and produces grain and wine: alabaster and jasper are obtained from the neighbouring mountains.

CLUNY, ORDER OF MONKS OF; a branch of the Benedictines. William, Earl of Warren, son-in-law to William the Conqueror, brought these monks into England, and built their first house at Lewes, in Sussex, about A.D. 1077 or 1078. Tanner (*Notit. Monast.*, edit. Nasm. p. ix.) says there were twenty-seven priories and cells of this order in England. But a deputation of certain monks from the parent abbey of Cluny sent to King Henry VI., in 1457, to ask for the restitution of possessions in England, which they stated had been long detained from them, complained that they had been deprived of the obedience of thirty-eight. The number, of which an account is given in the new edition of Dugdale's 'Monasticon,' certainly amounts to forty-two, exclusive of three cells whose existence is not very distinctly known.

All the monasteries of this order in England were governed by foreigners, had more French than English monks in them, and were not only subject to the foreign houses of Cluny, La Charité sur Loire, and St. Martin des Champs at Paris, but could be visited by them only. None of their priors were elected by the respective convents, but were named by the above-mentioned foreign houses. They could not receive the profession of their novices in England. To have their differences determined, they were obliged, in almost all cases, to go to their superiors beyond sea; by which means the greatest part of their revenues were carried to those foreign houses: and upon that account, during the wars with France, the different establishments of this order were generally seized into the king's hands as alien priories. After a petition from a large number of the English Cluniac monks to the parliament at Winchester in the 4th Edward III., these inconveniences were by degrees removed; and some of their houses were in that and the following reign made denizen. Bermondsey, one of the greater houses of this order, was made an abbey; and all of them were at last discharged from all manner of subjection and obedience to the foreign abbeys. Tanner says this did not take place till 1457, when the deputation already mentioned, in addition to claiming the restitution of their possessions generally, desired leave to enter all places depending upon their houses; but instead of obtaining what they asked, they were deprived of the subjection of all houses of their order in England.

The houses of Cluny abroad had pensions from the houses of their order in England, called *Apportus*, which probably amounted in the whole to a large sum; for Cotton, in his 'Abridgement,' p. 51, says, the abbot of Cluny had a pension from England of 2000*l.* per annum; and according to Rymer, old edit., vol. iii. p. 1009, and Prynne's 'Records,' vol. iii. pp. 386, 858, the foreigners sometimes demanded occasional supplies from their houses here; and even ran them into debt, as stated by Prynne, vol. iii. p. 750.

The prior of Lewes, in Sussex, was accounted high chamberlain to the abbot of Cluny, and was often his vicar-general in England, Ireland, and Scotland. (See Rymer, old edit., vol. xi. p. 464.)

The greater part of the houses of the Cluniac order were founded prior to the reign of King Henry II. Slevesholm, in Norfolk, was the last founded, about A.D. 1222. Four houses of this order were among those which Cardinal Wolsey dissolved in 1525.

In D'Achery's 'Spicilegium,' fol. par. 1723, tom. i. p. 641, are the 'Antiquiores Consuetudines Cluniacensis Monasterii, collectore S. Udalrico Monacho Benedictino.' A detailed history of the origin and progress of this order abroad will be found in the 'Histoire des Ordres Monastiques,' tom. v. p. 184, which is translated in Stevens's Continuation of Dugdale's Monasticon. (Tanner, *Notit. Monast.* ut supra; Dugdale's *Monasticon Anglic.*, last edit. vol. v. p. 3.)

CLUPE'IDÆ, a family of fishes of the section Abdominales. The Clupeidæ are placed by Cuvier between the Salmonidæ and the Gadidæ: in fact they form the fifth and last division of his section 'Malacopterygiens Abdominaux.' The fishes of this division may be distinguished by their wanting the adipose fin, by having the upper jaw composed of the intermaxillary bones in the middle, and the maxillaries at the sides, and by the body being always covered with scales. Some of the species ascend rivers.

The genus Clupea, as now restricted by Cuvier, may be thus characterized:—maxillaries arched in front; opening of the mouth moderate; upper jaw entire; body compressed and covered with large scales; teeth minute or wanting. To this genus belong the Herring, Sprat, Whitebait, Pilchard, &c.

Clupea Harengus, Linn., the *Herring* (French, *Le Hareng commun*) is a fish well known; its characters however will be useful to distinguish it from some allied species; they are as follows:—

Small teeth in both jaws; suboperculum rounded; veins on the infra-orbitals and gill-covers; dorsal fin behind the centre of gravity; this fin commences about half way between the point of the upper jaw and the end of the fleshy portion of the tail; ventrals placed beneath the middle of the dorsal fin; tail forked; length of the head one fifth of that of the body; the greatest depth of the body one fifth of the whole length. The upper part of the fish is blue or green, according to the light; the sides, belly, and gill-covers are silvery white; ordinary length, ten to twelve inches.

The term Herring is the same as the German Häring, which, according to some, is derived from Heer, an army, and is applied to these fishes from their visiting the coasts in such immense numbers.

'The Herring inhabits the deep waters all round the British coasts, and approaches the shores in the months of August and September for the purpose of depositing its spawn, which takes place in October, or the beginning of November. It is during these months that the great fishing is carried on, for after the spawning is over it returns to deep water. The mode of fishing for Herrings is by drift-nets, very similar to those employed for taking mackerel and pilchard, with a slight difference in the size of the mesh. The net is suspended by its upper edge from the drift-rope by various shorter and smaller ropes, called buoy-ropes; and considerable practical skill is required in the arrangement, that the net may hang with the meshes square, smooth and even, in the water, and at the proper depth; for according to the wind, tide, situation of their food, and other causes, the herrings swim at various distances below the surface.'

'The size of the boat used depends on the distance from shore at which the fishery is carried on; but whether in deep or in shallow water, the nets are only in actual use during the night. It is found that the fish strike the nets in much greater numbers when it is dark than when it is light: the darkest nights therefore, and those in which the

surface of the water is ruffled by a breeze, are considered the most favourable. It is supposed that nets stretched in the daytime alarm the fish, and cause them to quit the places where that practice is followed; it is therefore strictly forbidden *.'

The young are found on our coast during the summer months in great abundance, and are often taken in small-meshed nets used for catching other fishes.

The food of the herring consists principally of small crustacea, but they have been known to devour the fry of their own species.

Clupea Leachii (Leach's Herring). This second species of herring was discovered by Mr. Yarrell, and described in the proceedings of the Zoological Society for 1831, p. 34. An account by the same gentleman is also given in the Zoological Journal, vol. v. p. 278, where a figure of the species will be found. We will therefore give the distinguishing characters in Mr. Yarrell's own words.

'The length of the head compared to that of the body alone, without the head or caudal rays, is as one to three; the depth of the body greater than the length of the head, and compared to the length of the head and body together, is as one to three and a half; it is therefore much deeper in proportion to its length than our common herring, and has both the dorsal and abdominal lines much more convex: the under jaw longer than the upper, and provided with three or four prominent teeth just within the angle formed by the symphasis; the superior maxillary bones have their edges slightly crenated; the eye is large, in breadth full one-fourth of the length of the whole head: irides pale yellow; the dorsal fin is placed behind the centre of gravity, but not so much so as in the common herring; the scales are smaller; the sides without any distinct lateral line; the edge of the belly carinated, but not serrated; the fins small. The fin-rays in number are—dorsal, eighteen; pectoral, seventeen; ventral, nine; anal, sixteen; and caudal, twenty. Vertebræ, fifty-four.

'The back and upper part of the sides are deep blue, with green reflections, passing into silvery white beneath. The flesh of this species differs from that of the common herring in flavour, and is much more mild.'

Mr. Yarrell first discovered this species when examining the various kinds of fishes caught by the fishermen whilst engaged in taking sprats.

Clupea Sprattus, the *Sprat*, called in France *Le Melet*, *Esprot*, or *Haienguet*. This fish has by many authors been confounded with the young of the herring; it is however distinct, and its characters were first pointed out by Pennant; they are as follows:—proportions nearly the same as those of the herring, but the depth of the body is greater in proportion than in the young of that species; the gill-covers are not veined; the teeth of the lower jaw are so minute as to be scarcely visible to the touch. The dorsal fin is placed farther back, and the keel to the abdomen is more acutely serrated than in the herring.

Sprat-fishing commences in the early part of November; hence in season they immediately follow herrings, and the markets continue to be supplied with them during the winter months. Like the herrings, these fishes inhabit the deep water during the summer: they are so plentiful as to be frequently used for manuring the land, and are often sold as low as sixpence per bushel.

Clupea alba (Yarrell), the *White-Bait; French, Blanquette; German, Brietling*. This fish has been supposed to be the young of the shad: Mr. Yarrell, however, upon a careful investigation of the subject, ascertained it to be a distinct species: its distinguishing characters are—length of the head, compared with that of the body, and not including the tail, as two to five; depth, as compared to the whole length of the fish, as one to five; keel of the abdomen distinctly serrated, but not so sharp as in the shad. The dorsal fin commences half way between the tip of the muzzle and the end of the tail; the upper jaw is slightly crenated, the lower jaw is the longer and smooth. Its colour is silvery white, growing greenish on the back; the body is more compressed than in the herring, and the keel to the abdomen is more sharply serrated than in either that fish or the sprat.

The White-bait is caught in great abundance in the Thames as high up as Woolwich and Blackwall; the fishing commences about the beginning of April, and is continued to September. 'When fishing as high as Woolwich,' says Mr. Yarrell, 'the tide must have flowed from three to four hours, and the water become sensibly brackish to the taste, before the white-bait will be found to make their appearance. They return down the river with the first ebb-tide; and various attempts to preserve them in well-boats in pure fresh water have uniformly failed.' The food of the white-bait consists of small crustacea.

Clupea pilchardus, the *Pilchard; Le Célan*, in France. In size this fish resembles the herring; it is also nearly of the same form, but rather thicker, and of greater proportionate depth; the scales are larger, the head is shorter, the suboperculum is square, and the dorsal fin is more forward in position: the gill-covers are distinctly veined.

This fish is caught off the coast of Cornwall in great abundance; the fishing commences in July *. The food of the pilchard consists of small shrimps, and other crustaceous animals.

The *Shad* is another fish belonging to this group; it is however placed in a sub-genus called by Cuvier *Alosa*. He separated this, together with several other species, from the true Clupeæ, from the circumstance of their having the upper jaw deeply notched in the middle.

Two species of shad are found off the British coast; the first (the *Twaite Shad*, Yarrell) known generally by the name of *Shad* (Alosa finta), is about fourteen inches in length; its colour is brownish-green on the back, or inclining to blue in certain lights; the rest of the body is silvery; five or six dusky spots are observed on each side, and are disposed longitudinally, the first close to the head, and the others at short intervals; the length of the head as compared with the body is as one to five; the body rather exceeds this measurement in depth; the jaws are furnished with distinct teeth, and the tail is deeply forked.

This fish is found in the Severn and Thames in tolerable abundance. The principal fishing season for the shad in the Thames is about the second week of July: they begin to ascend the river about May for the purpose of depositing their spawn, and this being done they return to the sea about the end of July.

In former times the shad was caught as high up the river as Putney: it now rarely passes London Bridge, and is caught in the greatest abundance a little below Greenwich. Its flesh is dry, and therefore not much esteemed for the table.

The second species of shad, the Allice, or Allice Shad of Mr. Yarrell (*Alosa communis*), is considerably larger than the one just described, being from two to three feet in length: it may moreover be distinguished by its having only one spot on the side of the body, near the head, and that is sometimes scarcely visible: the jaws have no distinct teeth, and the scales of the body are rather smaller in proportion, though they are large in both species.

The Allice Shad is plentiful in the Severn, but of rather rare occurrence in the Thames.

CLUVE'RIUS (CLUWER), PHILIP, was born at Danzig, in 1580. His father intending him for the profession of the law, sent him to study at Leyden: but Cluverius showed more disposition for the study of geography and antiquities, and was encouraged in his bias by his acquaintance with Joseph Scaliger. In a journey which he made to Louvain and Antwerp, for the purpose of meeting Justus Lipsius, he fell in with some marauding soldiers, who stripped him of everything. On his return to Holland, finding that his father, being dissatisfied with his conduct, had stopped all remittances for his support, he joined the troops of the emperor, and served for two years in Hungary and Bohemia. In the latter country he made the acquaintance of a Baron Popel, who being arrested by order of the emperor, had written a pamphlet in his defence, which Cluverius undertook to translate into Latin, and published it on his return to Holland. The pamphlet being considered offensive, Cluverius was imprisoned, at the request of the imperial ambassador to the States General. He was soon after released, and his mother having sent him some supply of money, he set out on his travels to England, where he wrote 'De Tribus Rheni Alveis,' 4to. Returning to the continent, he travelled through France and Germany, and published his 'Ger-

* From Yarrell's 'History of British Fishes,' to which we refer our readers for a more detailed and interesting account of this and the other species here noticed.

* 'The number of fish taken by a drift boat in a night's fishing varies exceedingly; from five to ten thousand is considered moderate; it often amounts to twenty thousand. For the season's fishing, about one hundred and fifty thousand fish would be deemed favourable.'—Yarrell's 'British Fishes.'

mania Antiqua,' fol., Leyden, 1616. It is a work of considerable research, intermixed with much conjecture. Having made a journey into Italy, he was well received there, especially at Rome and Bologna, where his familiar acquaintance with most of the European languages excited great admiration. His next work, 'Siciliæ Antiquæ Libri Duo,' to which he added a short description of Sardinia and Corsica, fol., 1619, has been considered by many as his best work. On his return to Holland from Italy he suffered severe domestic losses, and his health rapidly declined. It was under these circumstances that he wrote his 'Italia Antiqua,' which was published after his death. It is a work of great research, and is still one of the best on the geography of antient Italy, although it occasionally requires correction from the more exact observations or discoveries of later geographers and antiquarians. Cluverius's friend and fellow traveller, Lucas Holstenius, added to it his own observations. Cluverius wrote also 'An Introduction to Universal Geography,' which has been repeatedly published. He died at Leyden in 1623, forty-three years of age. Danielis Heinsii *Oratio in obitum P. Cluverii*, at the end of the 'Introduction to Geography,' Leyden, 1624, gives an account of the principal incidents of Cluverius's life.

CLWYD, a river in North Wales, in the counties of Flint and Denbigh. It rises on the eastern declivity of the Bronbanog hills, a ridge belonging to the Hiraetog hills, and its upper course for a few miles is to the S. It then suddenly turns E.N.E., and continues nearly eight miles in that direction. About three miles above Ruthyn it declines to the N., and preserves this course to its mouth. The upper third of its course is through a narrow valley, which presents some very fine views. Below Ruthyn it enters the fertile vale of Clwyd, which extends upwards of fifteen miles in length, and is a pretty level tract from five to seven miles wide. Being studded with towns, villages, and seats, covered with verdant meadows and luxuriant fields, and enclosed on every side by brown and barren hills, this vale offers by the contrast a very pleasant view. A little below St. Asaph, the Clwyd is joined by the Elwy, which traversing a hilly tract brings to it a large mass of water, and the river below this town increases considerably in breadth. It soon afterwards enters the fertile and extensive marsh of Rhuddlan, called Morva Rhuddlan: three miles below the town of Rhuddlan it enters the sea through a small æstuary opening northward, and forming a port for small coasting vessels. The whole course of the river may be about thirty miles; it is navigable for flat-bottomed boats of about seventy tons up to Rhuddlan quay.

CLYDE, a river in Scotland, the third in magnitude, but the most important for its navigation. Its sources lie between 55° 18′ and 55° 28′ N. lat., where the highest summits of the mountain-range traversing South Scotland, the Lowthers (3150 feet), the Lead Hills, Queensberry Hill (2259 feet), and the range connecting the latter with Hart Fell (2790 feet), form nearly a semicircle. The rivulets which descend from this range unite in one stream about 55° 27′, and thus the Clyde is formed. The most southern and largest of these streams is the Daer; but another smaller stream is called Clyde, before the union. After the junction of these streams, the Clyde continues in the direction of the Daer northwards to Roberton, twelve miles lower down: in the whole of this part of its course the current is very rapid, and preserves the character of a mountain-stream. North of Roberton, the Tintoe Hills (2310 feet high) direct its course north-east; at Biggar its course is changed to the north-west and north, but below Roberton it flows west-south-west to its confluence with the Douglas Water, and accordingly it makes a large bend round the Tintoe Hills. Its course in this distance is little short of twenty miles, though Roberton and the mouth of the Douglas Water are only six or seven miles distant in a straight line. The valley through which it flows is wide, and the current is so gentle that in some places it is hardly perceptible. After the junction with the Douglas Water the rapidity of the stream increases, and the falls commence. The first is the Bonniton Linn, a cascade about thirty feet high, which is followed by the Corra Linn, where three waterfalls occur near one another, each apparently as high as Bonniton Linn. The rocks on both sides narrow the bed of the river so much, that the waters in some places rush down a chasm not more than four feet wide. Corra Linn is two miles above the town of Lanark. Two miles lower down is Stonebyres' Fall, which also consists of three distinct falls, altogether measuring about seventy feet in height. The scenery near the falls has considerable beauty. It is probable that the river in a space of about six miles descends not less than 230 feet, and the valley of the river above the falls may be about 400 feet above the sea. Below the falls, the river, continuing its north-west course, runs in a fine valley to Blantyre and Bothwell, the lands rising in a gentle ascent on both sides. Farther down its banks are sometimes bold and richly wooded: sometimes they extend in level plains. At Glasgow the Clyde has a considerable width, and vessels ascend to the Lower Bridge of Glasgow. From Glasgow to the vicinity of Dumbarton it runs through a level country. At no great distance from the castle of Dumbarton the Kilpatrick Hills rise on the north, and the Renfrew Hills on the south. Between these ranges the Clyde forms a wide æstuary, which at Dumbarton is about a mile across, and widens in its progress to the west, being at Greenock more than two miles in breadth. To the west of the latter place at Cloch Point it turns abruptly to the south, and reaches the sea by the two straits which lie between the island of Bute, the Cambray islands, and the coast of Ayrshire. The river south of Cloch Point is called the Firth of Clyde, a term which is frequently extended to that part of the sea which lies between the island of Arran and the coast of Ayrshire. The whole course of the Clyde, from the source of the Daer to the southern extremity of the island of Bute, may be about 100 miles.

CLY'MENE. (Zoology.) [NAIDÆ.]

CLY'PEAS. (Zoology.) [ECHINIDÆ.]

CLYPEASTER. [ECHINIDÆ.]

CLY'PEUS SOBIESKI (the shield of Sobieski), a constellation formed by Hevelius out of some small stars below Aquila, and passing the meridian about an hour before α Aquilæ. The name was given in honour of John Sobieski III., king of Poland.

Character.	No in Catalogue of Piazzi ( ) Bradley [ ]	No in Catalogue of Astron. Society.	Magnitude.
	(25)	2104	7
s^1	(101)	2137	6½
s^2	(107)	2142	6½
q	(111)	2145	6
	(128)	2151	7
	(144)	2159	7
	[2296]	2106	6
	[2313]	2125	5
	[2314]	2127	6½

CLYSTERS (the Greek κλυστήρ), lavemens, or enemata, terms bestowed upon medicinal agents introduced into the rectum, or lower bowel, with the intention of expelling its contents, or producing other local effects, but also occasionally to influence the system generally. The intestinal canal, from its commencement at the mouth to its termination in the rectum, is endowed with peculiar sensibilities; and though each portion of it has some special office, yet the whole responds to certain stimulants, whatever part they may be applied to. Thus purgative medicines may be introduced into it either by the mouth or by the rectum, and to a certain extent their action is the same, *i.e.* both will occasion an expulsion of the contents of the lower bowel; but the secondary influence on the system will be different, inasmuch as when the purgative is given by the mouth, during the whole course of its descent it produces, according to its nature, a special action on each portion as it passes, frequently causing an increased secretion of serum, and so materially affecting the general system. But when the same substance is introduced by the rectum, it only produces a local effect, by bringing about the expulsion of the contents, and influencing the system generally only when these were of such a nature as to occasion irritation by their retention. Clysters are also employed to assist in retaining the contents of the bowels when they are expelled too frequently, as in many cases of diarrhœa. Clysters of this latter kind are likewise used to

aid in retaining the contents of some of the neighbouring organs, such as of the uterus, in cases where abortion is threatened; and are also employed to allay pain and irritation in the bladder, kidneys, &c. Further, when the mouth or upper part of the throat is closed, as in spasmodic diseases, such as lock-jaw, or from tumours or paralysis, they are frequently made the vehicle for introducing either food or medicine into the system. The only other point requiring notice here is the fact that as the sensibility of the rectum is considerably less than that of the stomach, the doses of most articles given as clysters must be greater than when administered by the mouth.

Clysters are rarely, except in two instances, taken or administered without the order or superintendence of a competent medical attendant, and therefore we shall confine our observations chiefly to those two cases. The first and most common is where persons employ them for the relief of constipation; for this purpose tepid water or gruel is, by means of a proper instrument, thrown up into the rectum, and when a suitable quantity (about a pint) is used, it is generally speedily returned, bringing with it the other contents of the lower bowel. To the occasional use of such means no objection can be urged; but if employed habitually, and as a substitute for the efforts of nature, the greatest injury will result. Constipation does not in general depend upon a want of power in the rectum to expel its contents, but upon the use of improper diet, or a deficiency of the secretions of the upper part of the intestinal canal, such as the bile, which furnishes the natural stimulus to the intestines; and clysters never can effectually supply the want of these secretions. By the abuse of clysters, the tone of the whole alimentary canal may be lost, and the process of nutrition so impaired that wasting and other serious consequences have followed. Clysters even of the mildest kind should therefore be restricted to the accomplishment of temporary and occasional purposes. At the commencement of fevers and other inflammatory complaints, the speedy evacuation of the contents of the rectum is desirable; and where medicines cannot be taken by the mouth, owing to the irritability of the stomach causing their rejection, clysters of purgative substances, such as castor oil, or infusion of senna with sulphate of soda, may be used. For the relief of spasmodic diseases, clysters of the fetid gums, such as assafœtida, or of oil of turpentine, may be used. Sometimes tobacco in the form of infusion or of smoke is employed; but this requires the greatest care. The second case to which we have alluded, in which clysters are employed without medical superintendence, is that of tobacco-smoke thrown into the rectum of drowned persons: a more hurtful measure cannot be adopted; it is now abandoned by all intelligent persons.

Where clysters are employed to allay pain, or arrest premature action of the uterus, they generally contain tincture of opium, and are of small bulk; about a quarter of a pint of starch serves as the vehicle. Where nourishment is the object, they are also of small bulk; about half a pint of beef-tea alone, or with powdered cinchona bark, and a few drops of laudanum. Substances introduced into the rectum in a solid form are called suppositories.

CLY'THRA, a genus of Coleopterous insects, of the family Chrysomelidæ. The insects of this genus generally have the body more or less cylindrical; the antennæ short, with the basal joint thick, the two following joints short, and the remaining (with the exception of the apical joint) serrated, *i. e.*, produced internally, so as to resemble the teeth of a saw. The head is placed vertically, and inserted into the thorax, so as to be scarcely visible from above: often larger in the male than the female. The legs are moderately long, rather thick; in the males the anterior pair are often considerably larger than the two posterior pairs: the penultimate joint of the tarsi is bilobed.

The larvæ of these insects (at least those that are known) inhabit a coriaceous tube, which they drag about with them.

The Clythræ reside on trees and shrubs, and those found in this country appear in the beginning of the summer. The species are very abundant, and seldom adorned with metallic colours. In England we have five species, the most common of which is *Clythra quadripunctata:* this is not quite half an inch in length, and black; the elytra ochre-coloured, with four black spots, two near the base, and two near the middle. The next species which is not commonly met with is *Clythra tridentata.* This beetle is rather less than the last, and of a blue-green colour, thickly and finely punctured above; the elytra are pale-yellow and immaculate; the anterior pair of legs in the male are elongated.

CLY'TUS, a genus of Coleopterous insects of the section Longicornes, and family Cerambycidæ.

The species of the genus Clytus (a genus established by Fabricius) form a well-marked group among the Cerambycidæ, and are chiefly distinguished by their having the palpi short and nearly equal, the terminal joint thicker than the others, and truncated at the apex; the head narrower than the thorax, and the latter nearly globular or approaching to a cylinder. The body is elongate, and nearly cylindrical; the antennæ are shorter than the body, and filiform; the basal joint is rather thick: and the terminal joints are sometimes incrassated: the legs are moderately long.

These insects are generally of moderate size, and have the elytra adorned with arcuated fasciæ; their ground colour is usually black or brown, and the markings yellow.

About ninety species of this genus have been discovered, and they appear to inhabit every quarter of the globe: five are recorded as British, of which the more common are *Clytus mysticus*, *C. Arietis*, and *C. arcuatus*. *Clytus mysticus* is about half an inch in length: colour black; the base of the elytra red-brown; three bent white fasciæ are situated near the middle of the elytra: and there is a white patch at the apex. This species is common in the neighbourhood of London. We have frequently found its larva in the rotten wood of old blackthorns.

C. Arietis is about the same size as the last; its colour is black; legs and base of the antennæ reddish: the former with the thighs of the two anterior pairs blackish; thorax with a yellow band on the anterior part, and another on the posterior; scutellum yellow; elytra with four yellow bands.

This insect is frequently met with in gardens and woods in the neighbourhood of London and elsewhere. When handled it makes a peculiar noise, which seems to be produced by the friction of the thorax against the smooth part of the abdomen which is inserted in that part. Many of the Cerambycidæ have this power.

C. arcuatus is less common than either of the preceding species; it somewhat resembles *C. Arietis*, but is considerably larger and broader in proportion. The antennæ are entirely of a reddish-yellow colour; the legs are coloured as in the last-mentioned species; the thorax has a yellow band on the fore part, and an interrupted band in the middle: the elytra have three yellow bands, and towards the base three spots of the same colour; the scutellum is also yellow.

CNIDUS was a city of Caria on the S.W. coast of Asia Minor, at the extremity of a peninsula between the Sinus Ceramicus, or gulf of Cos, and the gulf of Syme, and facing the south part of the island of Cos, which is 10 miles west of Cape Crio, or Triopium, near which Cnidus stood. (Leake's *Asia Minor;* and Beaufort's *Survey of the Coast of Caramania.*) Cnidus is about 25 miles south of Halicarnassus. It was a Dorian colony, like Cos, Halicarnassus, and the other towns which formed the Dorian confederation of the Hexapolis. (Herod. i. 144.) It had two harbours divided by a narrow isthmus which joins Cape Crio to the mainland. The remains of two moles which enclosed the south or larger harbour are still visible, as well as those of the city walls, and a multitude of other ruins. (Beaufort's *Plan of Cape Crio*, in the last plate of his *Survey.*) Leake says, that 'there is hardly any ruined Greek city in existence which contains specimens of Greek architecture in so many different branches. There are still to be seen remains of the city walls, of the closed ports, of several temples, Stoæ, artificial terraces for public and private buildings, of three theatres, one of which is 400 feet in diameter, and of a great number of sepulchral monuments. Designs of the most important of these curious remains are about to be published by the Society of Dilettanti.' (Leake's *Asia Minor*, 1824.)

Strabo (xiv.) speaks of an observatory at Cnidus, and he mentions among the distinguished natives of the place, Eudoxus the mathematician, a contemporary of Plato; Ctesias, physician to Artaxerxes, who wrote on Syrian and Persian history; and the peripatetic Agatharchides, a friend of Julius Cæsar. He also says that Lipara, near Sicily, was a colony of Cnidus. He says nothing about the celebrated temple of Venus, said by some to have existed at Cnidus, but Cicero mentions, among the numerous works of art

seized by Verres, a marble Venus from Cnidus. (*In Verrem*, iv. 60.)

COACH. It is stated by Stow, that in '1564, Boonen, a Dutchman, became the queen's coachmanne, and was the first that brought the use of coaches into England.' Anderson (*Hist. of Com.*), on the other hand, says that 'about 1580 the use of coaches was introduced by the earl of Arundel.' 'Before that time (Hume, *Hist. of Eng.*) the queen (Elizabeth) on public occasions rode behind her chamberlain.' A long time elapsed before this luxury was attained by more than a few very rich and distinguished individuals, and a very much longer time before coaches became general. Coaches let for hire were first established (Anderson) in England in 1625. They did not stand in the streets, but at the principal inns. In 1637 there were, in London and Westminster, 50 hackney coaches. Stage coaches were first used in England soon after the introduction of hired carriages. In Scotland, in 1678 (Cleland, *Statis. of Glasgow*), Provost Campbell established a coach to run from Glasgow to Edinburgh, 'drawn by sax able horses, to leave Edinboro' ilk Monday morning, and return again (God willing) ilk Saturday night.' The first mail coach travelled from London to Edinburgh about 1785, and to Glasgow in 1788. The Scotch custom of the male passengers treating the female to breakfast and dinner on the road continued till these coaches were established.

The public are now so familiarized with the use of stage coaches that they are apt to forget that their origin is so recent. At the present time there is scarcely any small town through which some stage-coach does not pass, and no considerable road which is not travelled by many. Until the invention of springs, a man's endurance was the measure of his journey: it was impossible to travel fast, on account of the weight of the carriage; it was equally impossible to travel far, since no one could long bear the direct and unmitigated jar. Springs were the first means towards better travelling; since their invention, the increased speed and better appointment of English stage-coaches have been caused by the improvement of roads in conjunction with the great demand for rapid travelling. In this country the best stage-coaches are very perfect machines, and the arrangements by which they are conducted, when the number of persons and animals that are engaged comes to be considered, are extremely complete. The attendant expenses are very large, but are defrayed wholly by private speculators, excepting in the case of *mail* coaches, which convey the letters, the contractors for which, in consideration of certain services, receive an allowance from the state. The stage-coaches themselves usually belong to a coachmaker, who contracts with the speculators who 'work' them, for the supply of new carriages at certain intervals, and is liable to the expense of all repairs: for this he receives 2½*d.* or 3*d.* for every mile they travel. There is a duty per mile according to the number of passengers to be carried, rising from 1*d.* a mile for 4 persons, to 4*d.* a mile for 21 *. For each coachman a duty of 1*l.* 5*s.* is annually paid, and for each guard, excepting those of mails. The expense of *horsing* a four-horse coach running at the speed of from nine to ten miles an hour, may be stated at 3*l.* a double mile for 28 days (a lunar month); so that a person horsing ten miles of a coach passing backwards and forwards each day, should earn or receive by way of remuneration 13 times 30*l.*, or 390*l.* a year for his work. This may be considered a high rather than a low estimate, unless in a district where wages and rent of stables are high, and hay and corn dear. In a cheap neighbourhood, or where a large number of horses are kept, the expense will not be so great. Nevertheless a great many articles are to be provided: harness, which for four horses costs from 16*l.* to 20*l.*: horses, of which, for ten miles of ground, at least eight in summer and nine in winter will be required; their price will be from 5*l.* to 20*l.* each: corn and beans, of which each horse will eat little less than two bushels a week, together with hay and straw cut into chaff. Straw, shoeing, physic, and farriery, must also be reckoned, as well as stabling, stable utensils, and horsekeepers' wages, which for each man are from twelve to fifteen shillings a week. The firm must also defray the wages of coachmen, who receive about ten shillings a week, unless they drive backwards and forwards, and take fees from two sets of passengers each day, when they get no wages. The charge for washing the coaches must also be reckoned. To this long list must be added the heavy item of turnpikes. Mails are exempt from turnpike tolls, but a tax is paid, for them, to the government, and mileage to the contractor for the use of the coach. The Post-office allows them, according to their speed and the country through which they travel, from 4*d.* to 6*d.* a mile for carrying the letters; in consideration of this, it claims a right to limit their number of passengers, and regulate their speed and time of starting: the guard is the servant of the Post-office. Booking-offices and bookkeepers and advertisements are also to be paid for, as well as way-bills. One of these, on which the name and destination of each passenger and the direction of each parcel are inserted, is carried by the coachman, and delivered as soon as the coach stops to each proprietor or book-keeper, that he may examine its correctness and make any requisite entries. In the country nothing is paid to the booking-offices, but in London this is not the case: from 3*l.* to 4*l.* a (lunar) month is charged when the office is a mere shop for the purpose of booking, and does not belong to any coachmaster: if it is the property of a coachmaster, he takes 1*s.* for booking out of the fare of each passenger booked at his offices.

Some approximation to the expenses of coaching may be made from the above statement. The returns will not so easily be calculated. They consist of the fares, which are usually, for the outside passengers, at the rate of from 2½*d.* to 3*d.* a mile; for the inside somewhat less than twice this amount: the fares of mails are usually higher. Very arbitrary charges are made for parcels according to their size and weight. These however are not all the profits arising from stage coaches: the custom which they bring to inns must be reckoned a large item, when the proprietor is the owner or renter of an inn; and especially when the coach 'ends' at his house; and thus, though a coach may itself be worked at a loss, all things considered, to some of its proprietors at least it may be a remunerating speculation. The proprietors at the ends have obviously the greatest chance of profit; for nearly every passenger must spend something, however small, at their inn. They have likewise a greater advantage in porterage, and often get a profit from advertising, printing way-bills, and washing coaches, all of which are managed by them: they also get interest for the money that is earned by the coach, which remains in their hands until the monthly division among the proprietors.

The fastest coaches now travelling are between—

London and Shrewsbury	. .	154 miles,	in one day.	
„ Exeter	. . .	171 „	„	
„ Manchester	. .	187 „	„	
London and Manchester	(mail)	187 „	19h.	0m.
„ Holyhead	(mail)	261 „	26	55
„ Liverpool	(mail)	203 „	20	50

The Edinburgh, the Leeds, and the Devonport mails are also very rapid.

Short stage coaches, plying in the neighbourhood of towns, have been nearly superseded by omnibuses.

By an Act passed in 1833, coaches and omnibuses are allowed to ply for hire in the streets of London.

The coaches which form the trains upon rail-roads are of very different construction from those used on common roads: they are stronger, larger, heavier, and lower, the wheels being of smaller diameter: they are fastened together with links of chain, and there is attached to the back and front of each a 'fender,' acting on a spiral spring, by which concussion is prevented when the train is stopped. Some carriages adopted on the Greenwich Rail-Road seem to be of an improved construction: they are lower than those hitherto used; and as long as they remain upon the rail it would be very difficult to overturn them, even though the axles were to break, or the wheels come off.

Upon the continent, travelling in public carriages is not so rapid or so commodious as in England. The state of the road is in general such as to preclude any considerable speed, and to require great strength in the coaches.

In France the diligences are conducted by private speculators, who are obliged to use the horses of the Poste Royale. They are clumsy carriages, generally consisting of three bodies, and are drawn by five or six horses, usually driven by one postilion from his saddle. The first body, called the 'coupé,' formed like a chariot, contains three people; the second,

* The duty was formerly levied according to the number of miles travelled, without regard to the number of passengers. It would have been well, when the law was altered, either to have limited the capability of accommodating on each coach more persons than it was licensed to carry, or to have increased the penalties for a breach of the statute. The revenue is now greatly defrauded.

which is like a coach, the 'interieur,' holds six persons; the third, which is similar to a coach turned sideways, carries six or eight passengers, and is called the 'rotonde.' In addition to these, there is on the roof, before the place appropriated to the luggage, the 'banquette,' a bench sometimes furnished with a hood for the accommodation of four passengers. Should all these places be filled, the 'conducteur,' or guard, sits upon the luggage. The speed of these carriages is from four to five (English) miles an hour: the fares vary according to the part of the vehicle in which the place is taken; the 'coupé' being the dearest; the 'intérieur' the next; and then the 'rotonde' and the 'banquette.' The fare in the 'coupé' is rather more than half that of an outside place in England; but a large additional charge is often made to each passenger for all luggage above 30lbs. in weight. The malle-postes, by which the letters are conveyed, are conducted by the government. They are the fastest and best appointed public carriages on the continent. Their speed is at least eight miles an hour: they are drawn by horses of the Poste Royale, and carry one person in the cabriolet, with the courier, and two persons in the second body, or calêche. The fares are considerably higher than in the diligences.

Stage coaches (Schnell-posten) in Prussia are entirely in the hands of the government, which imposes a number of regulations, some of which cause considerable inconvenience. They consist of a 'cabriolet' in front, containing three persons; and an 'intérieur,' which holds nine people on three rows: the conducteur sits inside. These are the best foreign conveyances, excepting the mails: they stop less than the French, and travel about six miles an hour. The fares are about the same as for the outside of an English coach: luggage above 20lbs. is paid for extra, and if above 40lbs. weight, is sent in a slower and separate conveyance from the passenger. The letters are carried by the common coaches. In Italy the diligences are the property of individuals who purchase from the government the monopoly of a certain road. The mails, which are very similar to the French, are nearly as fast, and rather more expensive. Travelling by 'Vetturino' is the most common and cheapest method. In this case the driver agrees to carry the passenger from place to place in a given time, and for a given sum, all expenses on the road being generally included.

In Belgium the diligences are similar to, though faster than the French. In Spain there are not above six or seven roads on which diligences travel. They are monopolized by a privileged company, in which Ferdinand, the late king of Spain, and his queen, had shares. The carriages consist of a coupé and intérieur similar to the French: there are also two places on the back of the roof, on which are seated two guards armed with carbines; the conductor is called the 'mayoral.' Their speed is from five to six miles an hour. The mails travel faster: a person leaving Bayonne (1833) at twelve o'clock on a Friday, reached Vittoria the next morning, and remained there till the afternoon; at daybreak on Sunday he reached Burgos, and arrived at Madrid on Monday morning. The cabriolet in front contains one passenger, the courier, and the mayoral, and the calêche two more passengers.

In the United States of America the travelling has improved rapidly of late years, and on the best roads the public conveyances are superior to any other except the English. Some of the coaches contain accommodation for nine persons, six of whom sit on two opposite benches as in our coaches, and the other three on a seat parallel to and between the other two benches, with a leather strap drawn tight across the coach to support their backs. The body of these coaches is consequently larger than in the English coaches. Other coaches contain only two seats like the English, but no places for passengers on the top. In 1792 Mr. Jefferson, then secretary of state, wrote to the postmaster-general to know if the post, which was then carried at the rate of fifty miles a day, could not be expedited to one hundred; but even this latter rate would now be considered intolerably slow on the great post-roads. (Tucker's *Life of Jefferson*, vol. i., p. 376.)

COAGULATION, the solidification of a liquid produced without evaporation and without crystallization. It is also often effected without reducing the temperature of the substance coagulated, in which it differs from mere congelation.

Coagulation occurs in various ways in different fluids. Thus when albumen, or the white of egg, is heated, it is rendered solid or it coagulates; but when a solution of gelatin cools, it undergoes a similar change. The cause of the spontaneous coagulation of the blood, by which it is resolved into serum and coagulum has not been explained, and we are equally in the dark as to the immediate cause of the coagulation of cheese by the action of rennet; the separation of butter is attended with heat, and the immediate cause is mechanical action.

There are some cases of pure chemical action which resemble coagulation in appearance; when, for example, solutions of sulphate of soda and nitrate of lime are mixed, a sudden solidification takes place: but this is probably a case of confused crystallization, and not, strictly speaking, of coagulation.

COAITA. [Ateles, Species 1, vol. ii. p. 547.]

COAL, COMPOSITION OF. From the very different qualities of the several varieties of coal, it might naturally be expected that they would vary in composition, and this is actually found to be the case. They generally agree however in containing a much larger proportion of carbon than of the other elements, which are chiefly oxygen and hydrogen, and frequently a small portion of azote.

The composition of coal may be regarded under three different points of view: first, as to the quantities of combustible matter and earthy impurity; secondly, as to the mode in which the pure constituents of the coal are combined; and thirdly, as to its ultimate analysis.

With respect to the first, we shall state a few of the results obtained by Mr. Mushet.

	Volatile Matter.	Charcoal.	Ashes.
Derbyshire cannel coal	47·000	48·362	4·638
Scotch ditto	56·570	39·430	4·000
Welsh furnace ditto	8·500	88·068	3·432
Ditto stone ditto	8·000	89·700	2·300
Kilkenny coal	4·250	92·877	2·873

Macquer had observed that nitre does not detonate with oily or inflammable matter till it is reduced to coal, and then only in proportion to the carbonaceous matter which it contains. Following this opinion, Kirwan imagined that he might be able to distinguish the quantity of bitumen and maltha from that of mere carbon which the coal contained by deflagration with nitre. The method is not susceptible of great precision, but the following results are worth recording:—

	Charcoal.	Bitumen.		Earth.
Kilkenny coal	97·3	0		3·7
Compact cannel	75·2	21·68	Maltha	3·1
Swansea	73·53	23·14	mixt.	3·33
Wigan	61·73	36·7	do.	1·57
Newcastle	58·00	40·0	do.	—
Whitehaven	57·00	41·3		1·7

The following are the results of the analyses of some varieties of coal:—

Analyst.		Carbon.	Oxygen.	Hydrogen.	Azote.
Karsten.	Newcastle coal	84·99	11·78	3·23	
Ditto.	Cannel coal	74·83	19·72	5·45	
Crum.	ditto ditto	70·9	24·80	4·30	
Ure.	ditto ditto	72·22	21·05	3·93	2·8

As during the preparing of carburetted hydrogen gas from the decomposition of coal, a quantity of ammonia is generally, if not always, produced, it must in these cases contain ammonia, as shown in Dr. Ure's analysis. According to Dr. Thomson, indeed, who seems however to have overrated the quantity, caking or bituminous coal gives nearly 16 per cent. azote, and cannel coal above 13 per cent. of the same element; whereas Karsten and Crum find none, and Dr. Ure only 2·8 per cent. It is therefore probable that different kinds of coal have been analyzed under the same name; and the subject requires further investigation.

COAL-FIELDS, a term used to express those extensive carbonaceous deposits which are found in many parts of the world, but more especially in our own island. The following article is limited to a description of the various coal-fields of the United Kingdom, together with a short notice of the locality of coal-fields in other parts of the world.

The following general arrangement of the coal-fields of England and Wales, which is offered by Messrs. Conybeare and Phillips, seems to be as good and natural a classifica-

tion as can be adopted. 1. The great northern district, including all the coal-fields north of the Trent. 2. The central district, including Leicester, Warwick, Stafford, and Shropshire. 3. The western district, which may be subdivided into north-western, including North Wales, and south-western, including South Wales Gloucester, and Somersetshire.

Coal is found in these fields in strata of various thickness, alternating with slate-clay and sandstone; the alternations being frequently and indefinitely repeated. The coal-beds, which are of various qualities, are principally distinguished by the proportion of bitumen in the coal. Three species are enumerated, in each of which the quantity of bitumen has been ascertained. 1. The caking coal, likewise distinguished by many other provincial names, yields about forty per cent. of bitumen: this is the prevailing kind in the Northumberland and Durham mines. 2. The cannel coal, called parrot coal in Scotland, contains about twenty per cent. of bitumen: this coal occurs in Lancashire also. 3. The stone coal, likewise known under many other names, contains little or no bitumen: this is the ordinary coal of the Staffordshire and Scotch collieries. The coal seams, together with their alternating strata, called the *coal-measures*, usually lie on beds of millstone grit and shale (hard coarse-grained sandstone and slate-clay), which sometimes exceed 120 fathoms in thickness. Under this series is the mountain or carboniferous limestone, an assemblage of calcareous strata, of variable thickness, sometimes exceeding 900 feet. This limestone is frequently characterized by caverns* and fissures. The carboniferous limestone rests on a bed of old red sandstone, varying in thickness from 200 to 2000 feet. These four different series of strata are usually comprehended under the term 'coal formation.' Though in general the coal-measures lie above the three beds just enumerated, these beds do not form an essential part of the coal formation; for sometimes the coal-measures occur without these intermediate series, and repose immediately on the transition rock: such is the case in the coal-fields of Coalbrook Dale and of Dudley.

A general resemblance in structure appears in all the English coal-fields, but still with considerable local varieties. The phenomena by which dykes or faults are produced have sometimes uplifted the strata on one side of the dyke many fathoms above those on the other side, and occasioned irregularities extremely perplexing to the miner. These dykes are fissures which traverse the strata, often extending several miles, and penetrating generally to an unknown depth. These fissures are usually filled with clay, with the debris of the dislocated strata, or sometimes by basaltic rocks

COAL-DISTRICT NORTH OF THE TRENT. This great coal formation encircles the whole Penine chain on the east, south, and north; not however in one uninterrupted line, but in a series of detached coal-fields. 1. The coal-field of Northumberland and Durham. 2. Some small detached coal-fields in the North of Yorkshire. 3. The coal-field of South Yorkshire, Nottingham, and Derby. 4. The coal-field of North Stafford. 5. The South Lancashire coal-field. 6. The North Lancashire coal-field. 7. The Whitehaven coal-field.

1. *The Coal-field of Northumberland and Durham* commences near the mouth of the river Coquet on the north, and extends nearly to the Tees on the south. As far as Shields the sea is its boundary on the east; from that point it leaves a margin of a few miles between it and the sea, and extends about ten miles west from Newcastle. Its greatest length is fifty-eight miles, and its greatest breadth about twenty-four. The coal-measures of this field rest on the series of strata of the millstone grit and shale, and are in part under the magnesian limestone, the northernmost point of which is near the mouth of the Tyne. The beds of which this coal formation is composed dip towards the east and crop out towards the west, so that a section of them gives the idea of a form of a boat. In consequence of this disposition, the beds of coal in some places appear at the surface, while in the middle of the basin they are at great depths. At Yarrow, about five miles from the mouth of the Tyne, one of the thickest beds, called the High Main, is 960 feet deep, and rises on all sides; the dip of the strata averages one inch in twenty, but this is not uniform throughout; and therefore that bed does not rise to the surface at equal distances around Yarrow. The beds of the coal-measures are eighty-two in number, and consist of alternating beds of coal, sandstone, and slate-clay; making an aggregate thickness of 1620 feet, which varies however in different parts. The irregularities of the surface do not affect the dip or inclination of the strata; so that when a valley intervenes, they are found in the sides of the opposite hills at the same levels as if the respective strata had once been continuous. It is difficult to determine the exact number of beds of coal, in consequence of the different depths at which the same bed occurs, the numerous faults, and the varying thickness of the beds of coal and other strata. These strata occasionally enlarge and contract so much, that it is only by extensive observation that the identity of the seams can be ascertained. Dr. Thomson supposes the whole number of beds of coal in this field to be twenty-five; Messrs. Conybeare and Phillips state that forty beds of coal have been seen; a considerable number however of these are very thin. The two most important beds are those distinguished by the names of High Main and Low Main. The thickness of the first is six feet, and of the second six feet six inches. The Low Main is about sixty fathoms below the High Main. Eight other beds of coal occur between these: one called Bensham is four feet thick, and another called Coal Yard is three feet thick. Seven beds of coal have been observed under the Low Main, some of which are of considerable thickness, but of an inferior quality. The aggregate thickness of the whole number of seams is about forty-four feet; but there are eleven beds not workable, the thickness of some of them being only a few inches. Five others amount together to only six feet. Making proper deductions for these, it may be considered that the available beds amount to thirty feet in thickness. The different strata which occur in the G. Pit, Wall's End colliery, are given in the Parliamentary Report on Accidents in Mines, 1835. The space which it would occupy prevents our inserting this tabular view of the strata.

The whole surface of the coal-field is calculated by Dr. Thomson at 180 square miles, on the assumption that its length is twenty-three miles, and mean breadth eight. But according to the latest geological maps, these dimensions appear very far below the actual length and breadth, and it is perhaps nearer the truth to estimate the area at double that number of square miles. The greatest number of mines are on both sides of the Tyne, and not far from its banks. There are several in the northern part of the field, and many about five miles south of the Tyne, about midway between Newcastle and Durham.

The number of dykes or faults which traverse this field is very considerable. They appear to run in all directions. The most remarkable, called the Great Dyke, or 90-fathom dyke, has received the latter name because the beds on the north side of it have been thrown down 90 fathoms. Its direction is N.N.E. and S.S.W. It enters the sea a little to the south of Hartley, or about three miles north of Shields, and running westward crosses the Tyne at Lemington, about four miles west of Newcastle bridge. In some places it is only a few inches wide, but in Montagu colliery it is 22 yards wide, and is filled with hard and soft sandstone. From the southern side of this dyke two others branch off, one to the S.E. and the other to the S.W The latter, called from its breadth the 70-yard dyke, is also filled with hard and soft sandstone. This dyke intersects the upper or Beaumont seam of coal, but does not alter the level on either side.. The thickness of the seam however decreases, beginning at the distance of 15 or 16 yards from the dyke; and the coal first becomes sooty, and at length assumes the appearance of coke. The south-eastern branch is only 20 yards in breadth. Another dyke, which passes through Coaley Hill, about four miles west of Newcastle, is about 24 feet wide. It is filled with basalt in detached masses, which are coated with yellow ochre; a thin layer of indurated clay is interposed between the sides of the fissure and the basalt. The upper seam of coal is here about 35 feet from the surface, and where it is in contact with the dyke is completely charred. Another dyke, which crosses the Tyne at Walker, and traverses the Walker colliery, does not alter the level of the strata, but on each side of it the coal is converted into coke, which on one side in some places was found to be 18 feet thick, and on the opposite side only about 9 feet. (Conybeare and Phillips, p. 447.) At Walbottle Dean, 5½ miles west of Newcastle, a double vein of basalt crosses the ravine in a diagonal direc-

* The Derbyshire caverns are in this limestone.

tion, passing nearly due east and west; it underlies at an angle of 78 degrees, and cuts the coal strata without altering their dip, but the seam of coal is charred. A dyke, called the Cockfield Dyke, 17 feet wide, throws up the coal-measures on the south 18 feet. The Low Main coal, contiguous to the basalt, is only 9 inches thick, but enlarges to 6 feet at the distance of 150 feet from it; the coal contiguous to the dyke is reduced to a cinder. The dykes, if not large, are locally called *troubles*, *slips*, or *hitches*. These minor faults are numerous and extensive, and are a perpetual source of difficulty and expense to the coal-owner by disturbing the level of the strata and by the disengagement of carburetted hydrogen gas. They are not however without their use, being often filled with a tenacious water-proof clay, by which numerous springs are dammed up and brought to the surface. The faults which depress the strata have kept valuable seams within the basin, which would otherwise have cropped out and have been lost.

The coal-field of Northumberland and Durham supplies an enormous quantity of coal. Besides being consumed in its own district, London depends nearly altogether on it, as well as all the southern coast counties, with the exception of Cornwall. It is consumed along the eastern coast, including all the eastern counties as far west as Hull, Boston, Peterborough, Bedford, and Windsor. Shields, Stockton, Seaham, and Sunderland, are the ports from which the coal is shipped: the Tyne vessels, being the larger, are laden for the London market; those of the Wear, which are much smaller, sail to the small rivers and harbours along the coast, and carry coal as far west as Plymouth. An inquiry as to the probable duration of this supply is one of no small interest. Dr. Thomson calculates that this coal-field may fairly be expected to yield coal for 1000 years, at the annual consumption of two millions of chaldrons; but as we have no data by which to discover how much coal has been already consumed, we cannot tell how much of these 1000 years has already elapsed. Besides this, Dr. Thomson has taken the average annual consumption much too low for the present time. The coals shipped from the Tyne, the Wear, and the Tees, in 1835, amounted to 4,368,144 tons. The quantity of waste coal is estimated at one-third of the whole. Without therefore taking into account the consumption of the immediate district, the annual quantity of coal taken from the mines is more than 6,552,216 tons.

On the other hand it appears that in this calculation the area of the coal-field is very much under-estimated, being taken at 180 square miles. Professor Buckland, in his examination before the House of Commons, limits the period of supply at the present rate of consumption to about 400 years. Mr. Baily, in his Survey of Durham, states the period for the exhaustion of the coal to be about 200 years hence. Some proprietors of the coal-mines, when examined before the House of Commons, in 1830, extended the period of exhaustion to 1727 years. They assumed that there are 837 square miles of coal strata in this field, and that only 105 miles had been worked out. The small coal taken out of the pits is not considered worth shipment; large quantities of it are therefore often piled up near the mouths of the pits. These masses of coal are frequently set on fire, and burn for several years. Dr. Thomson describes two of these immense fires which were burning in 1814. About three miles to the north of Newcastle and three miles off the road from Berwick, on the left hand, 'one has been burning these eight years. The heap of coal is said to cover twelve acres. The other, on the right hand, is nearer the road and therefore appears more bright: it has been burning these three or four years (1814).' Of late years many more manufactories have been established in this district, by which a great quantity of the small coal is consumed.

Besides this coal-field there is another coal formation in the northern counties, which is minutely described by Dr. Thomson in the 'Annals of Philosophy,' November, 1814, under the name of the Independent Coal Formation. This tract terminates westward at Cross Fell, in Cumberland, is supposed to occupy the whole of Durham, and constitutes the whole of that part of Northumberland east of the Cheviots, exclusive of the coal-field already described. The different strata of this coal formation amount to about 147. The coal-measures here differ from those we have just noticed, in having limestone as well as sandstone and slate-clay alternating with the beds of coal; the coal worked in this formation is slate-coal, and is considered inferior in quality to the Newcastle coal. There are several collieries, but the coal is only employed for home consumption. The lowest bed of these measures crops out near Cross Fell. The coal of which it is composed, provincially called crow-coal, falls into powder when exposed to the air, and cannot be burnt by itself. The poorer class make it up into balls with clay, and use it for fuel. This bed is 387 fathoms below the lowest of the Newcastle beds. (*Ann. of Phil.*, vol. iv.) There are numerous lead mines in this tract.

2. *Detached Coal-fields in the North of Yorkshire.*—These are very limited in extent, being small insulated coal basins, lying in hollows in the gritstone. They occur near Middleham, Leyburne, Thorpefell, near Burnsell, and as far west as Kettlewell. The seam is seldom more than twenty inches thick. At Thedswell Moor the lowest seam is one yard, but the stratum diminishes and vanishes at the edges. Messrs. Conybeare and Phillips doubt whether these beds should not be referred to the thin coal seams subordinate to the millstone grit series rather than to the principal coal-measures.

Coal is wrought in some parts of the great carboniferous chain extending from Penigent to Kirkby Stephen. Here the great 'Craven fault' occurs, described by Professor Sedgwick ('On the Carboniferous Chain from Penigent to Kirkby Stephen,' *Geol. Trans.*, vol. iv. series 2) as ranging along the line of junction of the central chain with the skirts of the Cumbrian system, passing along the south flank of Casterton Low Fell, up Barbondale, thence across the valley of Dent through the upper part of the valley of Sedbergh, and along the flanks of Bowe Fell, and Wildboar Fell, to the ridge which flanks Ravenstone Dale. Throughout the whole of this line there are enormous and most complex dislocations, which affect the strata of the coal formation and produce other phenomena. Only one of the coal strata in the lowest part of the coal-measures is sufficiently valuable to be worked; it varies from eighteen inches to nearly four feet in thickness. At Turna Fell, near Hawes, in Yorkshire, and at Tan Hill, near the highest part of the road from Brough to Argengarthdale, this coal is extensively worked, and is of good quality. The same seam is found near Kirkby Stephen. Horizontal drifts have been carried into this bed near the top of Penigent, of Whernside, and of Great Colm; but in these parts it is of bad quality and not fit for domestic use, being mixed with ferruginous and pyritous shale. This coal varies in thickness from a mere trace to two feet. It was once worked to some extent on the south side of the valley of Dent, by means of horizontal drifts under Great Colm. It was only a few inches in thickness, but said to be of so good a quality as to be in great request. About 70 or 80 years ago it was sent on pack-horses from this place as far as Kendal, for the use of blacksmiths' forges, &c. Kendal has long been supplied with fuel from the Lancashire coal-fields; but this fact, of comparatively so recent a date, strongly illustrates the astonishing progress we have made in our modes of internal communication.

At the Barbon coal-pit in Westmoreland, a coal-bed of this series is likewise wrought; the lower part of it is however so impure as to be unfit for ordinary purposes, and is chiefly consumed in lime-works. The following is a section of the strata as occurring in the Barbon colliery:—

		feet.	in.
1	Alluvial soil	52	6
2	Plate (calcareous shale)	1	6
3	Limestone, the 4th or Mosdale Moor limestone of the great section .	27	0
4	Gritstone	27	0
5	Alternations of shale and gritstone .	12	0
6	Shale	30	0
7	Crow limestone	2	0
8	Plate with a 3-inch crow-coal . . .	1	6
9	Gritstone	27	0
10	Coal	1	2

The strata of the coal are in general much less regularly continuous than the strata of limestone. This however is not always the case. Some of the thin bands of coal here appear to continue with astonishing regularity. The following example is quoted from Professor Sedgwick. 'At Cross Pits, in the valley of Dent, the coal seam under the 12-fathom limestone is divided, by a band of clay half an inch

thick, into two parts, with distinct mineral characters; and the same coal seam, with exactly the same subdivisions, has been found in the mountain on the opposite side of the valley at the distance of three or four miles measured in a straight line. This seems to prove that a bed not more than a fraction of an inch thick was originally continuous throughout an area probably several miles in diameter.' (*Geol. Trans.* vol. iv. sec. 2, p. 101.)

3. *Coal-field of South Yorkshire, Nottingham, and Derbyshire.*—This extensive field, which in character is closely allied to that of Newcastle, is considered by some geologists as a re-emergence of the same strata from beneath the covering of magnesian limestone under which it is concealed through the intervening space. This coal-field occupies an area extending north and south from a little to the N.E. of Leeds nearly to Derby, a distance of more than sixty-five miles; its greatest width, 23 miles, is on the north, reaching nearly as far as Halifax to the west. On the south it extends towards the east to Nottingham, and is here about 12 miles wide; but in some parts it is much narrower. The strata of these coal-measures range in the same manner as in the Northumberland coal-field, from north to south, dip to the east and rise to the west and N.W., in which directions the lowest measures at length crop out against the rocks of the millstone-grit series, which constitute the higher ridges of the Penine chain. The strata of this coal formation are very numerous. There are twenty beds of gritstone at the least, some of great thickness. Most of these beds consist of grains of semi-transparent silex united by an argillaceous cement; the lowest of these beds is termed the millstone grit, beneath which no workable coal is found. Besides these gritstone beds there are numerous strata of shale (slate-clay), bind (indurated loam), and clunch (indurated clay), alternating with several beds of coal of different thickness and value. A hard argillaceous rock called crow-stone forms in some places the floor of the coal beds, and is supposed to be a variety of the clunch still more highly indurated. The numerous faults in this coal-field render it extremely difficult to ascertain the exact number and order of the coal beds. Mr. Bakewell (p. 384) states their number at thirty, varying from six inches to eleven feet, and the total thickness of coal at twenty-six yards. This however he considers as only an approximation. Three varieties of coal occur in these measures: *hard*, or stone, which burns to a white ash; *soft*, or bright, which burns to a white ash; *caking*, or crozling, which usually burns to a red ash. The first is esteemed the best, and is in much greater demand than the others. The thickest bed is worked near Barnsby. In a pit near Middleton, the property of the Reverend Ralph Henry Brambling, three seams are being worked; one at the depth of about forty to seventy yards from the surface, another thirty-eight yards lower, and the deepest from twenty-eight to thirty-two yards deeper, making the whole depth from one hundred and ten to one hundred and forty yards. The upper seam is about two feet eight inches thick, the middle seam from two feet ten inches to three feet four inches, and the lower one from four feet six inches to five feet.

The strata of this field, according to Mr. Farey, are traversed by an immense fault commencing from Allestry, in the south, and running in a zigzag direction through the south and east part of the field; the rise of the strata is said to be much more rapid on the western than the eastern side of the fault. Besides this great fault there are many others which traverse the field in various directions, and create an inextricable confusion by the rise and fall of the different strata, rendering it almost impossible to trace distinctly the continuation of each bed. This coal-field supplies the coal for the important manufactures which surround it, and also, by means of inland navigation, the midland counties south and east of Derbyshire.

A little to the west of the coal-field already described, coal has been found in two places about half way between Ashborne and Derby, but it has not been worked.

4. *Coal-fields of North Stafford.*—There are two detached coal-fields: the one situated on the N.E. of Newcastle-under-Lyme, distinguished as the Pottery coal-field; the other at Cheadle, to the east of the first. The form of the Pottery coal-field is triangular. Its vertex is near Congleton, from which point the sides diverge to the S.S.E. and S.S.W., running in each direction about ten miles; the base is estimated at about seven miles: Newcastle is nearly in the centre of the base. The strata dip from the two sides to the centre of the area. On the eastern side the inclination westward is estimated at one foot in four; on the other side it is still more rapid. Between Burslem and its eastern limit, nearly in the centre of the coal-field, it has been ascertained that there are thirty-two beds of coal of various thickness, generally from about three to ten feet each; but the strata are in general much dislocated in this field.

In the principal mines in this district coal is found at various depths, from fifty to three hundred yards and more; there has been a mine worked at the depth of more than four hundred yards. Some seams only twenty inches thick have occasionally been worked, but they are seldom worked under three or four feet thickness.

The Cheadle coal-field is an insulated basin surrounded by and reposing upon millstone grit; it is about five miles long and three miles broad, and is of little importance.

5. *The Manchester or South-Lancashire Coal-field* is separated from that of South Yorkshire and Derbyshire by the range of lofty hills extending from near Colne to Blackstone Edge, and thence to Ax Edge in Derbyshire. It commences near the western side of this range in the north-west of Derbyshire, and continues thence to the south-western part of Lancashire, forming an area somewhat in the shape of a crescent, having Manchester nearly in the centre. The chord or span between the opposite horns is about forty miles. It runs nearly due north from Macclesfield to a few miles beyond Rochdale, a distance of thirty miles; the part between Macclesfield and Manchester is however very narrow, being in some places not two miles in width. From Rochdale it extends westward to Bolton and Chorley, south-west to Leigh and Prescot, north-west to Preston, and north to Colne. Viewing it as a whole, the strata rise towards the exterior edge of this crescent-shaped coal-field, along which the strata of millstone grit, on which they repose, crop out from beneath them, and dip towards its inner edge, where they are covered by the superior strata of the newer sandstone formation, which contain occasionally beds of calcareo-magnesian conglomerate. Great disturbances have however interrupted the regularity of this arrangement, and caused divisions of the coal-measures which render it difficult to trace out the exact dimensions of the field. At Disley, in Cheshire, it 'bifurcates' into two branches, having an intermediate ridge or 'saddle of millstone grit, the eastern branch forming a trough, of which the strata crop out on both sides against the millstone grit.' This part of the field is a long narrow strip joined to the main field at Disley, and extending thence southwards fifteen miles to near Mearbrooke in Staffordshire. The strata of the western branch of this bifurcation, extending from Disley to Macclesfield, dip again to the west, but not at so great an angle as they rose, on the east side of the intermediate ridge. In other parts of the coal-field great faults occur, but it has not been sufficiently investigated by the geologist for them to be distinctly traced. Mr. Bakewell has investigated a small portion, which he distinguishes as the coal-field of Bradford: the result of his observations is found in the second volume of the *Geological Transactions*. This tract is rather more than two miles long, and little more than one mile and a furlong wide. It is situated on the river Medlock, a short distance E.S.E. of Manchester. It is surrounded on every side, except the east, by the red sandstone which prevails in the environs of Manchester. Beds of limestone pass under this, and overlay the coal-measures, in which there are several beds of coal rising to the north, under an angle of 30°. One of these, near the centre of the field, is four feet in thickness. To the north of these inclined beds there is a considerable disturbance, and the direction of the beds becomes suddenly vertical. One of the vertical beds, together with its accompanying strata, bears so close a resemblance to the four-feet coal above mentioned, that there is no doubt of their identity, and that the vertical stratum was, before the dislocation which severed them took place, a continuation of the first. With these vertical beds the coal-measures terminate: on the north an interval of the red sandstone succeeds for about 1400 yards, when coal-beds again appear, rising as before towards the north. All this indicates considerable faults and subsidences, which however cannot be accurately traced at present. The coal from the Lancashire field supplies Manchester, Liverpool, and the surrounding district.

6. *The North Lancashire Coal-field* is one of little importance. It lies midway between Lancaster and Ingleton; it is about eight miles long and six miles wide, but it has never been thoroughly examined, and its strata cannot be distinctly stated.

7. *The Whitehaven Coal-field* is situated on the west coast of Cumberland, and extends from near Egremont, south of Whitehaven, to Allonby on the north.

Mr. Buddle, in his examination before the House of Commons, states that the thickest seam in this coal-field is nine feet; and in speaking of the Whitehaven colliery calls it 'the finest in England, both in point of thickness of the seams and in extent.' The shafts in the mines belonging to this field are usually very deep: there are several 100 fathoms and upwards. The Workington mines, in which the same seam is worked as in those of Whitehaven, go to a considerable extent under the sea, but not so far as the Whitehaven collieries.

Central Coal District.—Under this division are classed the coal-fields of Ashby-de-la-Zouch, of Warwickshire, and South Staffordshire.

1. *The Coal-field of Ashby-de-la-Zouch* is of a very irregular figure, and so much dislocated, that it rather forms two small basins than one continuous whole. The greatest length from north-west to south-east is about ten miles, the greatest breadth about eight miles. The eastern extremity of this area approaches almost close to the transition district of Charnwood Forest. This coal-field is described by Mr. Farey 'as one of the highly curious out perhaps not uncommon occurrences, in the red marl districts; a tract entirely surrounded by a fault, or a series of faults, which unite, seem lifted up through the red marl strata, and denudated, the coal strata having rapid dips in various directions, while the surrounding strata of red marl are horizontal, or as nearly so as may be.' Of the two portions of the field, one ranges by Ashby Wold, about three miles on the west of Ashby; the other by Cole Orton, about the same distance on the east.

The Ashby Wold portion ranges from Swepston, four miles south of Ashby, to Bretby in Derbyshire: the inclination of the strata is towards Ashby; but between the out-crop of the beds and that town another crop has been traced near Brothorpe, dipping in a contrary direction. More than twenty coal-works have been opened on this line. The lowest shaft sunk is to the depth of 246 yards. One of the seams is from 17 to 21 feet thick. This great thickness is caused, it is supposed, by the running together of two or more seams—a circumstance which is known to occur in the coal-fields of South Staffordshire. The eastern portion of this district commences about a mile and a half north-east of Ashby, and extends about six miles in length, running parallel to the larger portion. The strata dip to E.N.E. In the pits belonging to Sir George Beaumont two coal-beds, each a yard and a half thick, are worked. On Cole Orton Moor several coal-seams, which have been proved to lie above these, have been worked at the depth of 116 feet.

2. *The Warwickshire Coal-field* commences at Wyken and Sow, two villages about three miles east of Coventry, and continues in a north-west direction to Polesworth and Wareton, about five miles east of Tamworth, a distance of sixteen miles: its average breadth is about three miles. All the strata rise to the E.N.E., the inclination becoming greater towards the eastern edge of the field, where in many parts it makes an angle of more than 45° with the horizon: towards the west it decreases to about one foot in three, and lastly in five. The principal collieries are near the south of the field, at Griff and Bedworth. The depth of the first is 117 yards, and the principal seam three yards in thickness. The same seams are worked in the Bedworth mines, but there the first and second coal-seams of Griff run together and form a five-yard seam. The intermediate strata of shale which separate them at Griff are found in the eastern shaft to be thirty-three, and in the western twenty-five yards thick; but they gradually decrease as they proceed westwards, till at length they entirely vanish.

3. *South Staffordshire* or *Dudley Coal-field*, the principal in the central district, extends from Beverton, near Badgely, on the N.E., to near Stourbridge on the S.W. The greatest length is about twenty miles, and its greatest breadth, from Walsall to Wolverhampton, is about seven miles, but it is very irregular towards the south, being almost divided into two parts. The area from actual survey has been found to be about sixty square miles. The southern portion, extending from Stourbridge to Bilston, about seven or eight miles in length and four in breadth, has been fully investigated by Mr. Keirs, and described by him in Shaw's 'History of Staffordshire.' No satisfactory account of the northern portions of this field has hitherto been published; many coal seams, of eight, six, and four feet in thickness, are worked in it. The southern portion is of much more importance, as it contains seams from 30 to 45 feet in thickness. This enormous thickness is however not one continuous seam, but a number of seams, divided by layers of what the miners call band, which are very thin beds of clay slate. The working of these thick seams is not so profitable as might be supposed. The pillars left standing in order to support the high roof are estimated at about one-third of the whole coal in the bed, and the small coal left in the mine is about equal to another third, so that only one-third of the whole is at present taken out of the mine.

In the coal-measures of this district there is an absence of the millstone grit, carboniferous limestone, and old red sandstone, which usually lie under the coal-measures. The coal-measures rest, in the Dudley Coal-field, on the transition rock at once, without any intermediate strata: this singularity is likewise observed in the Coalbrook Dale coal formation.

The coal district in South Staffordshire is traversed from N. W. to S. E. by apparently a line of hills, but they are not absolutely continuous, though they have a uniform general direction. On examination, the hills on the north and those on the south of Dudley are found to differ entirely in their character. The northern chain consists of highly inclined strata of limestone, against the sides of which all the coal-measures crop out at a considerable angle, but come nearer a horizontal position as they recede from these hills. The other chain of hills, on the S. of Dudley, are entirely composed of one mass of basalt and amygdaloid, and the coal-measures preserve their usual level in approaching the hills, not cropping out as they do upon the limestone chain. Two opinions are entertained with regard to these basalt elevations: 'they may be either the protruding edge of a vast basaltic dyke traversing the coal-field, or an overlying mass:' the latter is considered the more probable. The coal-measures on the south, near Stourbridge, appear to dip beneath the beds of the newer red sandstone formation: the beds of this and of the Warwickshire coal-field dipping in opposite directions under the super-strata give reason for supposing that they may extend continuously below this through the intervening space. The eastern side of the field, which extends a little beyond Walsall, is bounded by the same limestone with that of Dudley, and the coal-measures are observed again to crop out against it, thus lying in a basin between these two towns. That the coal-beds rise towards the north, and the upper ones crop out while others continue under the surface, is very satisfactorily shown by the comparison of the strata in different collieries. At Tividale the main coal is sixty and a half fathoms below the surface; at Bradley it is only twenty and a third; and the greater number of beds which cover the main coal at the former place have entirely disappeared before the main seam reaches Bradley; and farther to the north the main seam also crops out and disappears altogether. A very curious phenomenon takes place at Bloomfield Colliery, to the S. Bilston, thus described in the 'Geology of England,' p. 412 'The two upper beds of the main coal, called the roof, floor, and top slipper, separate from the rest, and are distinguished by the name of the *flying reed.* This separation grows wider, and at Bradley Colliery amounts to twelve feet, four beds of shale (slate-clay), and ironstone, being interposed. These two upper beds crop out, while the rest of the main coal goes on to Bilston, and is only eight yards thick.'

This district supplies coals to the numerous iron-works in the immediate neighbourhood, and the manufactories of Birmingham and its vicinity; besides which, all the neighbouring counties, as far south as Reading and Gloucester, are supplied by means of inland navigation

The clay ironstone occurs in various beds, but is only wrought in two: one of these is the bed under the main coal, and is wrought for iron ore.

Many faults or dykes occur in this field; they are usually fissures in the beds, filled up with clay, and very frequently the levels of the different strata vary in consequence.

There is a great fault near Bilston, which causes the dip of the strata to be reversed, the beds on the south side dipping south, and on the north side dipping north: this is however an unusual circumstance.

Dr. Buckland has observed indications of coal near the Lickey Hill, a few miles south of this coal-field.

WESTERN COAL DISTRICTS.—The coal-fields of this division are disposed around the transition district of North and South Wales. The north-western district includes the coal-fields of Anglesey and Flintshire, the western those of Shropshire, the south-western those of South Wales, of South Gloucester and Somerset, and of the Forest of Dean.

1. *Isle of Anglesey.*—At the distance of about six miles from the Menai Straits, and running nearly parallel to them, a remarkable valley stretches across the whole island. This valley opens on the north into Red Wharf Bay, and on the south into the æstuary of Maltraeth; it is flanked on both sides by parallel bands of carboniferous limestone, in the depression between which coal has been found, and it is thought probable that the coal-measures may extend through the whole line. Coal has been worked near the Maltraeth æstuary; and a few years since shafts were sunk in the neighbourhood of Trefdaeth. Successful trials have likewise been made at Pentreberen, about five miles north-east of the former pits: the beds are said to be of a tolerable thickness, and the coals of a good quality.

2. *Flintshire.*—The coal-field of this county extends north and south from Llanassa, near the western cape of the æstuary of the Dee, to near Oswestry, in Shropshire, forming an exterior belt co-extensive with the range of the mountain line from the north of the Clwyd. Where the carboniferous limestone is partially interrupted by the mountain of Sclattyn the coal shales rest immediately on the transition slate, of which that mountain is composed. (Conybeare and Phillips, p. 419.) The greatest length of the district in which the coal-measures are found is about thirty miles, but it must by no means be understood that coal is worked throughout. At Oswestry there is a very small detached piece, not more than three miles long and half a mile broad; there is then an interval of some miles. Near Chirk another coal tract commences, and runs north for about five miles; then another interval occurs; and a little to the north of Wrexham the principal portion begins, and thence extends to the coast and forms a narrow belt along it to the termination at the west cape of the Dee. The beds dip from one yard in four to two in three, sink beneath the æstuary of the Dee, re-appear on its opposite side, and finally sink beneath the strata of the newer red sandstone. This position of the coal-measures has led to the conjecture that they are connected with the beds of the Lancashire coal-field. The coal formation here commences with the same strata as those of Derbyshire. The beds of coal vary in thickness from three quarters of a yard to five yards. In the Baggalt mines three seams are worked, varying from three feet and a half to seven feet. Common, cannel, and peacock coal are found.

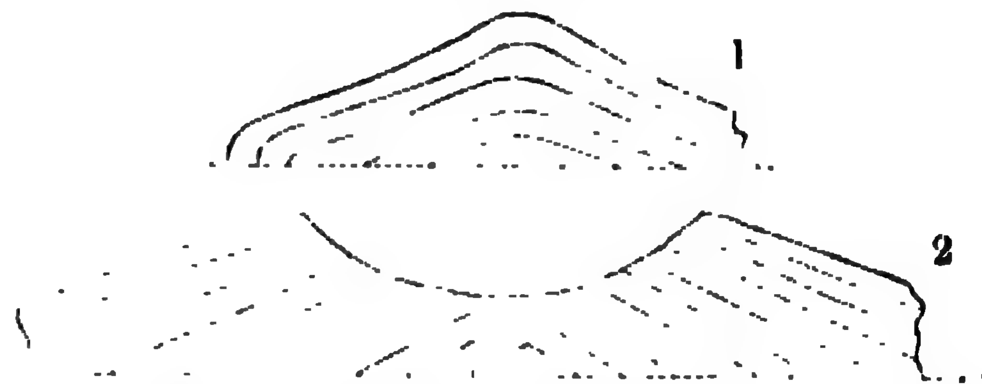
3. *The Coalbrook Dale Coal-field* rests on transition rock: it extends from Wombridge, in the parallel of Wellington, to Coal Port, on the Severn, a length of about six miles; its greatest breadth is about two miles. The coal-measures are composed of the usual alternating strata, which occur without much regularity, except that each bed of coal is always immediately covered by indurated or slaty clay, and not by sandstone. The strata are eighty-six in number. In Madely colliery a shaft is sunk 729 feet through all the beds. The first coal seam, which occurs at the depth of 102 feet, is very sulphureous, and not more than four inches thick; nine other beds of a similar nature, but rather thicker, occur between this and the depth of 396 feet. This coal is called 'stinking coal,' and is only employed in the burning of lime. The first seam of coal that is worked is 496 feet deep and five feet thick. Two other beds of coal occur, one ten inches and the other three feet thick, before the bed of 'big flint' sandstone, which is found at the depth of 576 feet: nine beds of coal occur, of the aggregate thickness of 16 feet, between the 'great flint' and the 'little flint' bed (an interval of 100 feet). Beneath the 'little flint' and the lowest bed of the whole formation, there is a sulphureous eight-inch coal. This account of the strata refers more particularly to the Madely colliery. The coal of this field is usually a mixture of slate-coal and pitch-coal.

West of the Coalbrook Dale field there are a few detached, narrow, and broken coal-fields in the plain of Shrewsbury, at the other side of the Wrekin.

Several small coal-fields occur in the Brown Clee Hill and the Titterstone Clee Hill, which rise a few miles south of the Coalbrook Dale-field; the latter hill is about four miles south of the former. The coals in the Brown Clee Hill only lie in thin strata, while the principal stratum in the Titterstone Clee Hill is six feet thick. The coal-fields on the Titterstone Clee Hill are represented as six detached portions, or separate basins, cut asunder and rendered irregular by a vast basaltic dyke, more than 100 yards wide, which intersects the hill. These coal-measures are more interesting to the geologist than the miner.

On the east of these hills, and between them and the Severn, a coal-field extends from Dense Hill and Billingsley on the north, to the borders of Shropshire and Worcestershire on the south, a length of about eight miles, coal being worked in several points along this line. Coal is also worked near Over Arley, on the Severn, adjoining this tract on the west. Only a few miles from the Billingsley coal-field at Pensex, near the foot of the Abberley Hills, is 'a small patch (rather than field) of coal-measures,' and another similar piece about three miles to the west.

THE SOUTH-WESTERN COAL DISTRICT comprehends the several coal-fields near the æstuary of the Severn and the Bristol Channel, including parts of the adjacent counties of Gloucester, Somerset, Monmouth, and Glamorgan. The various coal-fields distributed over this district are apparently insulated, yet they have several points of connection. 'They all rest on one common base of old red sandstone; they all appear to have been formed by similar agency, and at the same era, to have been subject at a later period to the same revolutions, and lastly to have been covered partially by similar overlying deposits.' (*Geol. Trans.*, vol. i., 2nd series.) Messrs. Buckland and Conybeare have found that the several basins in the coal formation are divided by lines (which they term '*anticlinal*') formed by the saddles of the strata or meetings at the surface of their vertical angles, on each side of which the strata dip in opposite directions.*



The coal-measures are thus surrounded by exterior bands of mountain limestone and old red sandstone, in the order of the outcrop of the subjacent beds. This district includes three principal coal basins, together with some smaller ones, adjacent to and closely connected with the two last. First, the South Welsh coal basin; second, that of South Gloucester and Somerset; third, that of the Forest of Dean.

1. *The Coal-field of South Wales* is upwards of 100 miles in length, and the average breadth in the counties of Monmouth, Glamorgan, Caermarthen, and part of Brecon, is from eighteen to twenty miles; it becomes much narrower in Pembrokeshire, being there only from three to five miles. This area extends from Pontypool on the east, to St. Bride's Bay on the west, and forms a vast basin of limestone, in which all the strata of coal and ironstone are deposited. The deepest part of the basin is between Neath and Llanelly: from a line ranging nearly east and west through Neath, all the strata rise on the south towards the south, and on the north towards the north, cropping out at the edges. The limestone crops out at the surface all round the coal, except where its continuity is interrupted by Swansea and Caermarthen Bays. The depths from the surface to the various strata depend upon local situations. The upper coal seam does not extend a mile either north or south beyond Neath, and not many miles in an east or west direction, and its utmost depth is not above fifty or sixty fathoms; the next stratum of coal and those likewise beneath, being deeper, crop out at greater distance from the centre, and so of the rest in proportion to their depth. The lowest bed is 700 fathoms deep at the

* 'Sometimes these lines follow the crests of the chains of hills (*fig.* 1); sometimes they are to be traced along the course of valleys (*fig.* 2); the hills in the latter case being formed not by the saddles of the strata, but by the escarpments cutting through them.'

centre, and all the principal strata lie from 500 fathoms deep to this depth. But this district is intersected by deep valleys, which generally run in a north and south direction, intersecting the coal. By driving levels in the hills, the beds of coal are found without the labour and expense of sinking shafts; there are also many pits in the low valleys. (Martin, *Phil. Trans.* for 1806.) This basin contains twelve beds of coal, from 3 to 9 feet thick, making an aggregate of 70½ feet; and there are eleven more, from 18 inches to 3 feet, together equal to 24½ feet; the whole thickness is therefore 95 feet. A number of smaller seams likewise occur. On the south side of the basin, from Pontypool to Caermarthen Bay, the coal is principally of a bituminous nature; on the north-east it is a coking coal; on the north-west, stone coal. Great faults occur in this field, which traverse it generally in a north and south direction, and throw the strata out of their level 40, 60, 80, or 100 fathoms. These dislocations are not often shown on the surface. A principal fault occurs at Cribbath, where the strata of limestone stand erect: another of considerable magnitude lies between Ystradvellte and Penderryn. These dykes are usually filled with clay, but one of some magnitude has been observed near Swansea, which is many fathoms wide, and filled with fragments of the disrupted strata, the level of which differs by more than 240 feet. The rich ironstone of this basin supplies extensive iron-works in the neighbourhood. The principal beds of ironstone occur in the lower part of the coal-measures; the most valuable bed is found beneath the lowest coal. The strata of this coal formation dip much more rapidly on the south than on the north; on the south they make an angle of 45° with the horizon, and on the north dipping only 10°. The coal from the South Wales basin supplies the whole of Wales with the exception of the more northern counties, the whole of Cornwall, and the western half of Devonshire.

2. *South Gloucester and Somerset Basin.*—This basin occupies an irregular triangular space, bounded on the south by the Mendip Hills, which are a high range of mountain limestone resting on an arch of old red sandstone. The vertex of the triangle is on the north, at the village of Tortworth in Gloucestershire: the western side from the Mendips to the vertex is formed by three insulated masses of high land, separated by narrow intervals, the widest of which is less than three miles. Near Tortworth the range extending from Almondsbury is deflected suddenly to the south, and this may be considered the north-eastern frontier of the basin; it may also be traced through Wickwar to Sodbury. The south-eastern limit, from Sodbury to near Mells, the eastern extremity of the Mendips, is mostly concealed by overlying deposits. Partial denudations occur at Lansdown, near Wick Rock, where the limestone can be traced in the valleys dipping towards the centre of the coal basin. From Lansdown to the Mendips the continuity of the basin can be well ascertained, the coal-measures being uncovered in some of the valleys in which the principal collieries are situated. In other places shafts have been sunk through the overlying horizontal deposits, beneath which the coal is worked. The greatest length of this area is 25 miles: the width, from the collieries near Bath to those of Bedminster near Bristol on the west, is about 11 miles. In this district there is much local irregularity, and the stratification of the coal-measures is so deranged that they have very different and varying levels. In some parts the beds are denuded, in others concealed by the more recent horizontal deposits, and thus the whole basin is divided into several detached coal-fields.

The uncovered areas are distinguished by Messrs. Buckland and Conybeare ('Observations on the South-west Coal District of England,' *Geol. Trans.*, 1st vol., 2nd series) into the northern, the central, the southern, the eastern, and the western coal-tracts. The northern is the most extensive and elevated: its greatest length, from the vertex of the basin near Tortworth to the village of Brislington on the left bank of the Avon near Bristol, is 12 miles; its greatest breadth from east to west is nearly four miles. The collieries of Iron Acton, Sodbury, and Kingswood, are in this coal-tract. Along the northern limits of the basin, from Sodbury to Cromehall and Titherington, the coal-measures are exposed in immediate contact with the limestone; on the western, southern, and great part of the eastern border of the tract they are skirted by hills of red marl capped by lias. At Pucklechurch shafts are sunk to the coal through both the latter formations.

The central tract, which begins on the south of Dundry Hill, is divided into two parts by a narrow valley; the northern portion, about six miles in length, extends from Burnet on the north-east to Knowl-hill, near Stanton Drew, on the south-west; near Pensford it is about two miles in breadth. The southern division, extending from Temple Cloud on the west to between High Littleton and Timsbury on the east, is about three miles in length. To the south-east of this central coal-tract the coal-measures are entirely concealed by superjacent deposits through a distance of six miles. Throughout this space however many shafts are sunk, some through the red marl of the valleys, and some through the lias which occurs on higher ground. There are several of the latter description in the parishes of Timsbury and Poulton; but the deepest is on Clan Down near Radstock, which is sunk 200 fathoms before its horizontal adits are driven. Another shaft, beginning in the oolite, is sunk on the edge of the same Down near Paulton, but it is not so deep as the former, since here there is a rise in the strata, and the coal seams are in consequence much nearer the surface. On the ascent of the hill above Chilcompton the coal-measures are again exposed to the extent of about an acre.

The southern coal-tract commences near the point where the road between Bath and Shepton Mallet crosses the Nettlebridge stream, and ends between Vobster and Mells; its greatest length is six miles, and greatest breadth two and a half miles. The coal-measures of the eastern coal-tract are laid open in the vale of the Buoyd at Wick and Upton, both in Gloucestershire; they are likewise exposed at Newton St. Loe, on the left bank of the Avon below Bath, dipping towards the interior of the basin. Several seams are worked at Upton and Newton. The western coal tract lies at the south-east of Leigh Down, near Bristol. Beds of red marl form the upper strata in the shafts of all the coal-pits of this tract between Long Ashton and Bedminster. The coal-field of Nailsea, lying more to the west, is a continuation of this tract.

A great undulation in the strata of the coal measures which form the coal-basin of Somersetshire and the south of Gloucestershire alters the apparent position of the seams so much that it is very difficult to ascertain the identity of each throughout the various collieries. The local names of the several seams also tend to confuse the geologist.

The chain of hills which limits the western boundary of this coal district presents remarkable anomalies between Clevedon and Portbury, along its northern escarpment. A great fault ranging along the edge effects a very considerable subsidence of the strata. In consequence of this 'the coal-measures, depressed to the level of the old red sandstone, appear to occupy its place, and seem to dip beneath the mountain limestone, on which, in fact, they repose.' (*Geol. Trans.*, vol. iv., 2nd series.)

The following are the principal subdivisions of the coal-measures in this basin, beginning with the highest. The upper coal shale; the Pennant grit (sandstone); the lower coal shale; and the millstone grit. We refer the reader to the Memoir already quoted for a minute description of the various sections of this coal basin.

In the Bedminster colliery on the S.W. of Bristol, there are three seams of good bituminous coal: the deepest and uppermost are wrought; the former is four feet three inches, the latter two feet and a half to three feet thick; the middle seam is only one foot. The interval between the two principal seams is twenty-three fathoms; the lowest shaft sunk is 127 fathoms deep. These beds are obviously referrible to the lower coal shale. Works were established at Cromhall, a few miles north of Acton, about forty-five years ago, but were soon abandoned, in consequence, it is supposed, of the numerous derangements of the strata. They were again resumed, but not very profitably. The coal differed extremely in thickness in different places, varying from thirty to six inches; while in some parts no coal at all was to be seen. It never retained a regular thickness for many yards together, and in some places it diminished gradually in the line of the dip until it disappeared altogether.

The following is a section of the Cromhall colliery, as given in Mr. Weaver's 'Geological Observations on parts of Gloucestershire and Somersetshire,' *Geol. Trans.*, vol. i. series 2—

	yds.	ft.	in.
Soil and clay	2	0	0
Gritstone or sandstone	23	0	0
Clunchy bind, or indurated slate-clay	1	0	0
Coal, bituminous, very binding, yielding only small coal	0	2	3
Stony clunch, or sandy indurated clay	2	0	0
Rock or sandstone, partly compact and quartzy	15	0	0
Duns, or slate-clay	2	2	3
Black duns, being the immediate roof (very tender), or bituminous shale	0	0	9
Coal, bituminous, yielding large coal 16 inches, small coal 14 inches	0	2	6
	47	1	9

The floor consists of clunch, more or less stony; that is, indurated clay, more or less sandy.

In the meridian of Pitcot, situated a little to the N.E. of Nettlebridge, all the strata are vertical: a perpendicular shaft is there sunk to the depth of eighty fathoms in one bed of coal.

The total number of mines worked in this district is probably less than it was formerly, but the whole produce is certainly much greater, owing to improved methods in working. The seams of coal are very thin in comparison with those which are worked in the principal coal-fields of England, and in most of those would be rejected as not worth the working. The aggregate thickness of the seams worked in any single coal-pit scarcely exceeds one of the ordinary seams in the principal district. However, most of the old pits might again be worked to advantage by the present improved methods, and much of the area is still untouched, and ready for future speculation.

3. *The Forest of Dean Coal-basin* occupies an irregular elliptical area, circumscribed by the triangle formed by the Wye, the Severn, and the road from Gloucester to Ross; the largest diameter from N.N.E. to S.S.W. is about ten, the shorter about six miles. All the strata dip uniformly towards the centre of the basin. The whole of this coal tract, together with the high land that surrounds it, constitutes a mountain group, the average height of which above the level of the sea is about 900 feet. The aggregate thickness of the whole strata of the coal-measures is, according to Mr. Mushet, 500 fathoms; he divides the different strata into seven series, in which there are 27 beds of coal.

On the north of the Forest of Dean basin, and at the distance of a few miles, is the Newent coal-field, a very small tract surrounded and concealed by overlying strata of the newer red sandstone. This field has not been sufficiently explored to enable us to give an accurate account of it.

This description of the coal-fields of England contains sufficient examples both of the general position and distribution of the coal-beds, and of the variations to which they have been subjected, to give the reader a pretty complete view of the subject. Many matters of detail however, and some of the highest interest, are necessarily omitted in such a rapid sketch.

Scotch Coal-Fields.—Several small coal-fields occur in Dumfriesshire, forming narrow basins in the valleys of the great southern transition chain of Scotland. In the valley of the Nith, in the parishes of Sanquhar and Kirkconnel, there is one of these coal-basins, about seven miles in length, and two and a half in breadth. Three seams of workable coal have been discovered, averaging in thickness from three to four feet and a half. The range of the seams is in the direction of the Nith; the measures are disturbed by a dyke running north and south, by which the strata are much depressed on the east side. In the parish of Canobie, adjoining Cumberland, coal is worked in two pits: the principal seam is five feet ten inches thick.

The principal coal-district of Scotland occupies the tract which forms the great central lowland of Scotland, and lies between the great transition chain on the south, and the still loftier primitive mountains of the Highlands on the north. 'The whole of this wide tract is occupied by the coal-measures, the carboniferous limestone, and the old red sandstone, associated in every possible manner with vast accumulations of every variety of trap.' (Conyb. and Phil.)

To begin with the most eastern county in this tract in which coal is found: in the parish of Dunbar, on the east coast of Haddington, there are indications of coal, but no seams have yet been found of sufficient thickness for working. In the parish of Ormiston, in the west of the same county, coal is found in abundance; there are three workable seams of coal, varying from twenty-eight to forty-three inches in thickness, and the coal is of good quality.

Coal occurs in Fifeshire, on the north side of the Forth, but it is not at present much wrought. There are mines in the parish of Dysart, where coals were first raised in Scotland more than 350 years ago. There are fourteen beds of coal, three of which are now being worked; they are of the respective thicknesses of five, eight, and five feet. The pits are about sixty or seventy fathoms in depth.

Coal is wrought in several places in Mid Lothian.

In Lanark the coal-fields are numerous and extensive. The Wilsontown coal-basin and the Climpy basin both occur in the parish of Carnwath; the latter is on the west side of the first, the crop of the one nearly approaching the other. There are several seams of coal in these basins. The main coal, or lowest, is called the four feet coal; another seam is about two feet in thickness. The accompanying strata are sandstone, varying in composition and hardness; bituminous shale, slate-clay, and thin beds of ironstone alternate with the coal. Several small faults, or hitches, as they are here called, traverse the field. On the S.W. part of the field, the main coal is generally fourteen feet below the crow coal, which is the next superior bed; on the N.E. the space between the same beds is only about two feet. These basins form part of the great coal-basin of the Clyde, which extends on both sides of that river, and the centre of which is near Dalziel. On the same side of the river, in the parish of Monkland, there are many collieries, in which the thickest bed of coal is nine feet, and it is of good quality. On the left bank of the river coal is wrought in several places. Five mines are worked in the parish of Rutherglen, and others in the adjoining parish of Cambuslang. There are several also in Hamilton, Stonehouse, and Douglass. Throughout this district seven seams of coal are usually found within 415 feet of the surface; five of these seams are of sufficient thickness and good quality to be wrought. The following shows the situation and thickness of the seams of coal in the pits in the parish of Cambuslang:—

	feet.	in.
Upper soil (earth and clay) from 20 to	30	0
Argillaceous white freestone	20	0
Shale, with vegetable impressions, from 30 ft. to 40 ft.	35	0
1st seam, soft coal	4	6
Interval (hard freestone, &c.)	26	6
2nd seam, soft coal	3	6
Interval (shale)	63	6
3rd seam, shaft coal	5	0
Interval {shale, 20 feet; hard ironstone, from 6 to 18 in.; shale and freestone}	65	2
4th seam, soft coal	6	0
Interval {shale; freestone}	83	0
5th seam, soft coal	3	0
Interval {ironstone; shale}	10	0
6th seam, hard coal, good for iron-works, forges, &c.	3	6
Interval (shale)	1	6
7th seam, soft coal	1	6
Till, &c., with thin seams of coal	84	0
	445	8

The thickness of the coal and of the freestone varies considerably in different parts, and the numbers here given must be taken only as an approximation. The strata are frequently deranged by faults, several of which run from east to west. In their general arrangement the strata usually run nearly parallel to each other, although they have always a considerable angle of elevation, and uniformly dip towards the Clyde. A great fault occurs between Hamilton and Quarter, and none of the principal seams are wrought for some miles north of this spot, the coal-beds being sunk nearly 100 fathoms lower than those out of the fault. The main seam worked at Quarter is five feet six inches thick, and consists of four distinct varieties of coal.

This coal-basin of the Clyde extends into Renfrew, where

there are many collieries. Coal is wrought in the parish of Eastwood, in that county, in several seams of various thickness; but none exceed two feet six inches. The whole are of good quality. Five of them are wrought in pits varying in depth from ten to forty fathoms. The coal measures here consist of the usual series of freestone, shale, &c., dipping generally to the S.W. This coal formation partly surrounds the loch of Castle Semple, and continues without interruption into Ayrshire, around Kilbirnie Loch, and onward to Ardrossan. Coal occurs in different places in Dumbarton, where, among other parishes, it is wrought in Easter Kilpatrick. It is also found abundantly in Stirlingshire, along the southern base of the Lennox hills. Coal likewise occurs throughout Linlithgow, and is worked extensively in that county; it is likewise found in Clackmannan, and in the south of the counties of Perth and Kinross.

Irish Coal-Fields.—Mr. Griffiths, in his 'Report on the Leinster Coal District,' gives an excellent summary of the Irish coal-fields, from which what follows is taken. '*If* we except the Leinster district, my knowledge of the coal-fields of Ireland is as yet very limited: and though each in its turn will form the subject of a separate report, I think it right to draw attention to them in this place, by giving such general information as I possess respecting their situation and circumstances. Coal has been discovered in more or less quantity in seventeen counties* of Ireland; but I believe the island contains but four principal coal-districts, viz., the Leinster, the Munster, the Connaught, and the Ulster. The two former contain carbonaceous or stone-coal, and the latter bituminous or blazing coal.

'The Leinster coal-district is situated in the counties of Kilkenny, Queen's county, and county of Carlow. It also extends a short distance into the county of Tipperary, as far as Killenaule. This is the principal carbonaceous coal-district. It is divided into three detached parts, separated from each other by a secondary limestone country, which not only envelops, but in continuation passes under the whole of the coal-district; a fact which was indisputably, though accidentally, proved by the Grand Canal Company, who sank a pit through eighteen yards of black slate-clay and flinty slate into the limestone in search of coal. The Leinster coal-district is therefore of subsequent formation to the limestone.

'The Munster coal-district occupies a considerable portion of the counties of Limerick and Kerry, and a large part of the county of Cork. It is by much the most extensive in Ireland; but as yet there is not sufficient information respecting the number, extent, or thickness of the beds of coal it may contain.

'Coal and culm have been raised for near a century in the neighbourhood of Kanturk, in the county of Cork. At Dromagh colliery, I understand, the work has been carried on to a very considerable extent, and its annual supplies of coal and culm have materially contributed to the agricultural improvement of an immense extent of the great maritime and commercial counties of Cork and Limerick, which must otherwise have continued neglected and unreclaimed.

'Many circumstances combine to make the examination of this district of peculiar interest and importance; and as a recent application has been made by the Cork Institution to the Dublin Society to aid the undertaking, it is probable that this immense district will shortly be minutely explored. From all that has been ascertained, it is very clear that the dip of the beds and the quality of the coal differ materially from those of the Leinster district. In the Munster district the beds run east and west, and dip to the south, forming an angle of 45°. In the Dromagh colliery, where all the beds which have been discovered have been successively and in general successfully wrought, four beds incline on each other, and at no greater distance than 200 yards. The first of these beds is a three-feet stone-coal, and is the leading bed. All faults, checks, and dislocations, similar to those which are discoverable in this bed, are in general to be encountered in the other three. The names of the four beds are, the *coal-bed*—this lies farthest to the north; the *rock-coal*, so called from its being comparatively of harder quality than the other beds; the *bulk-bed*, so called from its contents being found in large masses or bulks; and *Bath's bed*, so called from the name of a celebrated English miner, by whom it had been many years ago discovered and worked. The coal-bed consists of three-feet solid coal, and is not sulphureous; the rock-coal is nearly of the same thickness with the leading bed, but is very sulphureous, and, having the soundest roof, is the most easily wrought. The other beds are of the culm species, but of peculiar strength. * * * The bulk-bed forms immense bulks and masses of culm, in which the miners have frequently been unable to retain the ordinary directions of roof and seat.

'No work has been undertaken in the Munster coal-district to a greater depth than 80 yards. The present work at the Dromagh colliery is at that depth; it is heavily watered, and consequently expensively wrought. The quality of the coal and culm improves as the work descends. * * *

'The Connaught coal-district stands next in order of value and importance to the Leinster and Munster, and possibly may be found to deserve the first place when its subterranean treasures shall be explored. At present nothing is known, except that the outer edges of several beds of coal have been observed, but they have not been traced to any distance, so that their extent is by no means ascertained. The coal is of the bituminous species. This coal is particularly adapted to the purposes of iron-works, foundries, &c. &c.

'The Ulster coal-district is of trifling importance when compared with the foregoing. It commences near Dungannon, in the county of Tyrone, and extends in a northern direction to Coal Island, and in continuation to the neighbourhood of Cookstown. No beds of coal worth working have hitherto been discovered between Coal Island and Cookstown, but certainly the coal strata extend there. The principal collieries are at Coal Island and at Dungannon. The coal of this district is bituminous. I understand that indications of coal have been observed at Drumquin, in the county of Tyrone: and also at Petigoe, to the north of Lough Erne. Possibly the coal-formation may extend from the neighbourhood of Cookstown westward to the north of Lough Erne.

'Besides the foregoing principal coal-districts, there are others of less consequence. Bituminous coal has been found in the neighbourhood of Belturbet, in the county of Cavan, and at the collieries of Ballycastle, in the county of Antrim; but the Antrim coal-district is not very extensive. These collieries have been wrought for a number of years. The coals are of a slaty nature, and greatly resemble both the coal and the accompanying rocks which occur in Ayrshire, and probably they belong to the same formation.'

Continental Europe.—In the centre and south of France some small coal-fields occur in the valleys of the Loire, the Allier, the Creuse, and the Dordogne, the Aveyron [Aveyron], and the Ardèche, between ridges proceeding from the primitive central group connected with the Cevennes; and, in a few localities, some of the thickest beds of coal yet discovered have been found. In the north of France, the coal-formation occupies a very large tract of country, running westward from Hardinghen, near Boulogne, by Valenciennes, and thence up the Scheldt and down the Meuse to Eschweiler, beyond Aix-la-Chapelle [Belgium.] The district along the Meuse, between Namur and Liege, is said to resemble in its geological structure, as well as picturesque features, the Somersetshire and South Gloucester district: the strata being broken and deranged, exhibit, if possible, still more contorted and inverted positions of the respective beds. The defiles of the Sambre and the Meuse (*Geol. Trans.*, vol. i., 2nd series) present an exact counterpart of those of the Avon and the Wye. The coal-districts in the north of Germany are probably the prolongation of the Belgium formation. On the north-east and south-east of the Harz mountains, near Ballenstadt and Neustadt, the coal-formation occurs resting on the transition rock of that group. In Saxony coal is found in many places along the northern foot of the Erzgebirge. It is extensively worked near Zwickau and near Dresden. There is a very extensive coal-district in Bohemia, extending into Upper Silesia. This district lies between the great primitive chain of the Erzgebirge

* The counties are Antrim, near Ballycastle; Donegal, north of Mount Charles; Tyrone, in the Ulster coal-district, and at Drumquin; Fermanagh, north continuation of the Connaught coal-district, and at Petigoe; Monaghan, near Carrickmacross; Cavan, near Belturbet; Leitrim and Roscommon, in the Connaught coal-district; Westmeath, near Athlone; Queen's county, Kilkenny, and Carlow, in the Leinster coal-district; Tipperary, continuation of the same; and Clare, Limerick, Kerry, and Cork, in the Munster coal-district.

and the Riesengebirge, on the north, and the great district of primitive slate which occupies the larger part of Bohemia south of the Beraun and Upper Elbe. More than forty beds of coal are supposed to be worked in this district.

Good coal has been found in Southern Russia, near Toula, lat. 54°, long. 37°, where it is worked; but the quantity is so small, and the difficulty of working it beneath a loose and half-liquid bed of quicksand is so great, that it seems unlikely to be of much utility. Coal has also been worked at Bakhmont, lat. 48°, long. 38°, in the government of Katerinoslaf. (Mr. Strangways on the Geology of Russia. *Geol. Trans.*, vol. i., 2nd series, p. 35.) In Sweden coal occurs to the south of the primitive tract, near Helsingborg, at the entrance to the Baltic. Coal is also worked in the island of Bornholm. [BORNHOLM.]

Laborde mentions coal as occurring in Spain; in eight places in Catalonia, in three in Aragon, and one in New Castile. Coal, it is conjectured, will be found in several parts of continental Greece. On the north of Constantinople coal is said to be found.

Asia.—In Asia coal has long been worked in China, but what has hitherto been obtained is said to be very slaty. Coal is likewise found in the countries immediately around the Persian Gulf, but of a very indifferent description. In most parts of Cutch, coal occurs in abundance, and of good quality; it ignites quickly, and burns to a white ash. Coals are also found in Bundelcund. There are large mines in a district called Burdwan, 130 miles from Calcutta, now worked to the extent of 14,000 or 15,000 tons annually. They are situated on the banks of a river connected with the Hooghly, and were first worked about eighteen years ago, but they have not been in extensive operation more than ten or eleven years; the principal seam is about 9 feet thick, and is about 90 feet from the surface. Coal has likewise been got from a mine opened near Bhaugulpoor, on the Ganges, about 300 miles from Burdwan. Another coal-field has been discovered on the banks of the Hooghly, at a place called Merzipore, about 40 miles from Calcutta; the coal is found close to the surface, and the thickness of the principal seam is said to be two feet. Coal of good quality likewise occurs in the Birman empire.

In the United States of North America, east of the Appalachian range, there is an extensive coal-field in Virginia, twelve miles west of Richmond: it is about ten miles wide, and has been traced near forty miles. It is surrounded by primitive rocks, and said to lie also on primitive rock. This coal-field supplies the town of Richmond, and also Washington and other places to which it can be taken by land-carriage. In the great secondary formation west of the Appalachians, which consist of limestone, sandstone, slate-clay, and freestone, with vegetable impressions, a bed of coal is said to extend from the Ohio to the Tombigbee in Alabama. The coal commences at Cumberland, in the state of Maryland, between the Alleghany and Tuscarora ranges; and west of this town it occurs generally in beds varying from an inch to ten feet in thickness. About Wheeling, on the Ohio, a great quantity of coal is used for manufacturing purposes. The sandstone in this part is considered as the lowest member of the formation. The consumption at Pittsburg is also considerable. West of the Mississippi the argillaceous sandstone is associated with beds of coal and ironstone. The Ozarks contain beds of coal.

In the southern provinces of Chile there is an extensive coal-field, that is partially worked.

Nova Scotia contains a great quantity of coal. The great coal-field of Pictou has been traced from Carriboo Harbour to Merigomish, comprising an area of more than 100 square miles. The seams of coal resemble much more those of Staffordshire than those in the north of England. One bed is described by a practical miner, who went to Nova Scotia to superintend the opening of the mines, as 40 feet in thickness; it is not however equally good throughout, and it was thought advisable to work only 10 feet of the upper part. According to Bouchette the seams of this field vary in thickness from 1 foot to 50 feet. The coal is highly bituminous and burns well. There is another coal-field, also of considerable extent, in the north-west part of the county of Northumberland, between the river Macan and the shores of the Chignecti Channel. In this district there are eight strata of coal, varying from one to four feet in thickness. This coal is not considered so good as that of Pictou. There are also indications of coal in the township of Londonderry and at Onslow; on the north shore of the Mina's basin; at the head of Pomket Harbour, in the upper district of the county of Sydney; and on the south shore of Wallace Harbour, in the county of Cumberland. (Bouchette.)

Coals of excellent quality are got in Cape Breton. The coal-measures have been traced in the western part of the island, on Inhabitants River, at Port Hood, and at Mabou. On the east the Sydney coal-field is of great extent; it commences at Miray Bay and runs along the coast to the Great Bras d'Or, being in length about 40 miles, and averaging 5 miles in breadth. 'From a minute calculation, after deducting harbours, bays, and all other interpositions, it appears that there are 120 square miles of land, containing available veins of coal.' (Bouchette.) The measures in this district contain fourteen beds of coal, varying from 3 to 11 feet in thickness. The coal is wrought at Sydney Harbour and at Lingan.

Coal is found very abundantly in Australia, and is worked extensively in the Newcastle district, on the Hunter's River. A coal formation likewise occurs in Van Diemen's Land.

COAL PLANTS. That coal is the result of the mineralization of vegetable remains is abundantly proved, both by the numerous impressions of plants found in connection with it, and by the traces of organization which are still discoverable in it. Mr. Hutton has shown that it is possible to prepare the different varieties of bituminous coal in such a way as to render slices of them partially transparent, when the microscope shows the elementary tissue of the plants which have produced them. Cannel coal, he says, seems to retain traces of its structure through its whole mass, while it exists in fine coal in small patches only, which appear as if mechanically entangled. (*Fossil Flora*, ii., 25.)

In general the impressions of plants occur chiefly in the shale of the coal-measures, that is, in the mud which separates the seams of coal, or in the sandstone or ironstone associated with the coal formation; and as such impressions are much more distinct than any that occur in the coal itself, it is chiefly from them that our ideas of the vegetation from which coal has been produced have been derived. They are often present in inconceivable beauty and abundance, as may be imagined from Professor Buckland's graphic account of those in the coal-mines of Bohemia. In his 'Bridgewater Treatise,' he says, 'The finest example I have ever witnessed is that of the coal-mines of Bohemia just mentioned. The most elaborate imitations of living foliage upon the painted ceilings of Italian palaces bear no comparison with the beauteous profusion of extinct vegetable forms with which the galleries of these instructive coal-mines are overhung. The roof is covered as with a canopy of gorgeous tapestry, enriched with festoons of most graceful foliage, flung in wild irregular profusion over every portion of its surface. The effect is heightened by the contrast of the coal-black colour of these vegetables with the light ground-work of the rock to which they are attached. The spectator feels himself transported, as if by enchantment, into the forests of another world; he beholds trees, of forms and characters now unknown upon the surface of the earth, presented to his senses almost in the beauty and vigour of their primeval life; their scaly stems and bending branches, with their delicate apparatus of foliage, are all spread forth before him, little impaired by the lapse of countless ages, and bearing faithful records of extinct systems of vegetation, which began and terminated in times of which these relics are the infallible historians.'

Such remains consist chiefly of impressions of leaves separated from their branches, and of casts of trunks more or less in a broken state; and with them occur now and then pieces of wood or remains of trees, in which the vegetable texture is to some extent preserved. Of the leaves the greater part is more or less mutilated; those of ferns, which are extremely numerous, have lost their fructification in the majority of instances; and it frequently happens that the leaflets of compound leaves have been disarticulated either wholly or partially. Stems or trunks are in all cases in a state which must be supposed to result from decay previously to their conversion into coal; destitute of bark, or with the principal part of that envelope gone, and often pressed quite flat, so that all trace of their original convexity is destroyed. Where ripe fruits are met with, they are not in clusters as they probably were when alive, but separated into single individuals. Of flowers there is no trace that can be satisfactorily identified; for Antholithes Pitcairniæ, the most perfect that has yet been discovered, is

altogether of a doubtful nature. The authors of the 'Fossil Flora' represent it as having been so much decayed at the time it was imbedded in the shale, that all its parts are blended together, and no longer distinguishable as separate organs.

If remains such as these, although of recent plants, were submitted to a botanist for examination, he would find it impossible to form any other than a general idea of their nature, and he would be unable to speak with any confidence as to the precise plants which produced them. Such being the case with recent fragments, where colour, texture, odour, flavour, and many other points would exist, of which a skilful botanist would avail himself, independently of the more important points of structure of which systematic writers principally make use, it is obvious that the difficulty of determining the nature of the fossil remains of plants must be far greater; for with them the evidence upon which an opinion is to be formed is of the most circumscribed and sometimes doubtful nature: so great indeed is the difficulty, that a French botanist of no mean reputation is known to have declared that all speculations upon the nature of antient vegetation ought to be referred to the romance of natural history, and have no concern with science. There is little doubt now that some of the theories to which the study of the vegetable remains of the coal-measures has given rise are romantic enough; but on the other hand it is equally certain that they furnish some most important and precise evidence as to the nature of the vegetation with which our planet was clothed in the earliest ages of the existence of organic matter.

Coal plants may be divided for practical purposes into three classes: 1, those of which only wood still containing organic structure has been found; 2, those which have an obvious analogy with recent plants; 3, those with which no existing analogy has been traced. We select a few of the most remarkable cases under each of these heads.

1. *Coal plants of which wood only containing organic structure has been found.*

The existence of wood in the coal formation with its texture still preserved, is a discovery of very modern date. Mr. Nicol, of Edinburgh, claims the credit of having first invented the art of preparing fossil wood so as to show its structure microscopically; Mr. Witham has investigated the subject extensively, and he has been followed by Messrs. Lindley, Hutton, and others. The result of these inquiries has been, that wood still preserving its texture exists in a mineral state extensively throughout the coal-mines of the North of England; that it in most cases has a structure analogous to, although not identical with, that of recent coniferous wood; and that in those cases in which its structure is not coniferous, it is unlike that of any existing trees.

Coniferous wood is known among other things by the presence of small disks upon the sides of its woody tubes; differences in the arrangement of these disks have given rise to the formation of the genera *Peuce* and *Pinites*, to one or other of which all the coniferous coal-wood seems referrible. Mr. Nicol believes that it may all be referred to either the existing genera Pinus or Araucaria. Specimens of this kind of wood occur sometimes of considerable size. A trunk of Pinites Brandlingi has been found 72 feet long, and another of Pinites Withami 36 feet long.

The wood, to which Mr. Witham's genus *Anabathra* apparently belongs, is known by its longitudinal section representing tubes marked by parallel transverse lines resembling the steps of a ladder. This is very uncommon, and is stated by Messrs. Lindley and Hutton to belong to the genus *Stigmaria*, which will be mentioned hereafter.

One specimen in iron-stone also has occurred of the wood of the genus Lepidodendron; it consists principally of loose cellular tissue, having near the centre a zone of spiral vessels, connected with the bases of the leaves by arcs of spiral vessels, and having rudiments of wood on the outside of the zone. (*Fossil Flora*, 2. tt. 98 and 99.)

2. *Coal plants which have an obvious analogy with recent plants.*

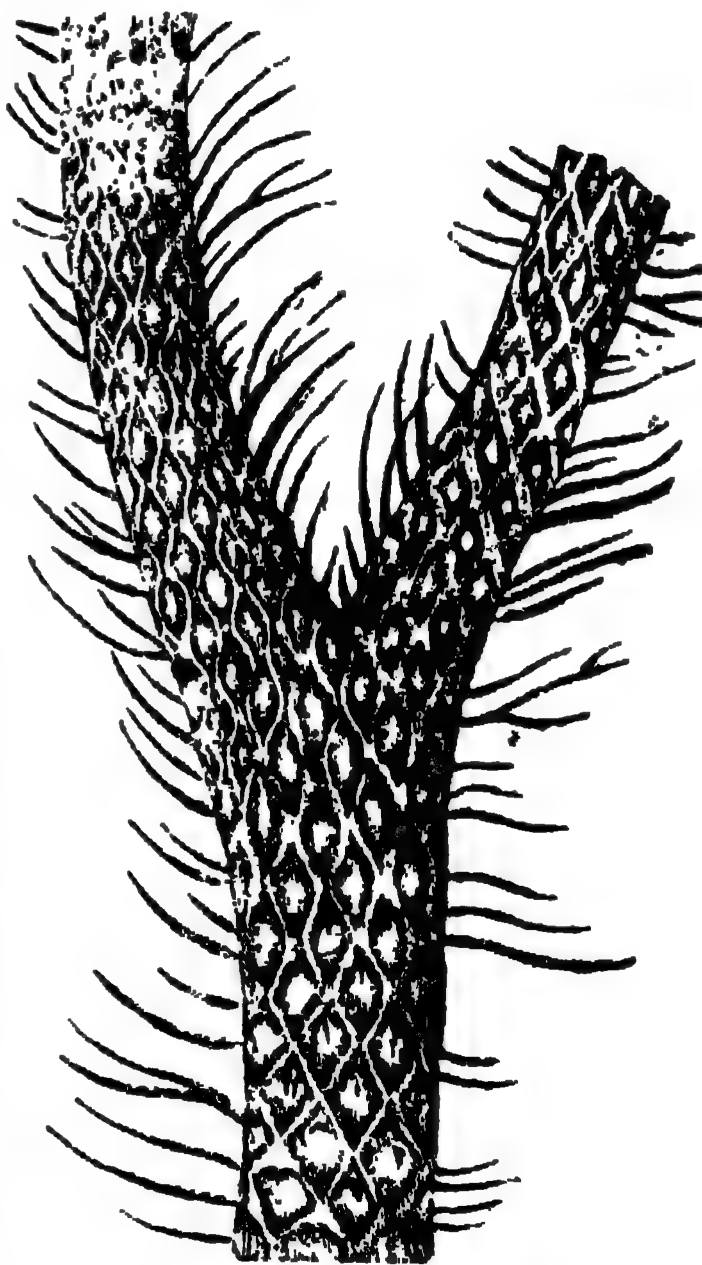
Coniferous plants have left few remains, except wood, by which they can be recognised. A cone of *Pinus anthracina* has been met with, and there is reason to believe that certain stems called *Bothrodendron*, having numerous minute dots upon their surface, and deep circular oblique concavities, four or five inches across, at intervals of ten or eleven inches, are also remains of trees of this description. It is probable moreover that some of the fossils referred to the genus *Lepidodendron* are really coniferous plants, especially *Lep. longifolium*; but upon this point nothing certain is known.

Palms occur occasionally, but in solitary fragments; they are among the rarest of well-identified coal plants. Their trunks have not been discovered; their leaflets are mostly of a wedge-shaped figure, resembling those of Caryota or Wallichia: their fruit, to which the name of *Trigonocarpum* is given, are more frequent, and are always found in clusters, but separate from each other. It would seem as if the bunches of their fruit had lain in water till the pulpy parts rotted away, and the nuts fell asunder and settled down into the mud, where they were finally imbedded. These remains are generally oblong, three-sided or six-sided bodies, not more than an inch long. The following represents some states of Trigonocarpum Nöggerathi.

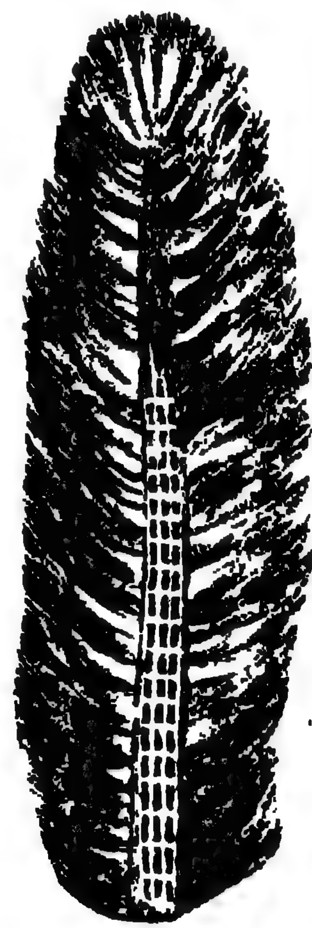


[Trigonocarpum Nöggerathi.]

Lycopodiaceous plants, or what are considered analogous to them, form a very large proportion of the vegetable remains of the north of England coal-field. They are represented by impressions closely covered either with lozenge-shaped spaces disposed in a spiral manner, or by small scale-like leaves, which are supposed to have produced those spaces by falling off. When they branch, they have often been observed to do so in a forked or dichotomous manner. Sometimes they are minute, and no larger than existing Lycopodia, but they are occasionally found of considerable size, some having been seen which, although mere fragments, were between forty and fifty feet long, and more than four feet in diameter. An idea of their appearance will be gained from the accompanying figure of Lepidodendron Sternbergii.



[Lepidodendron Sternbergii.]



[Lepidostrobus variabilis.]

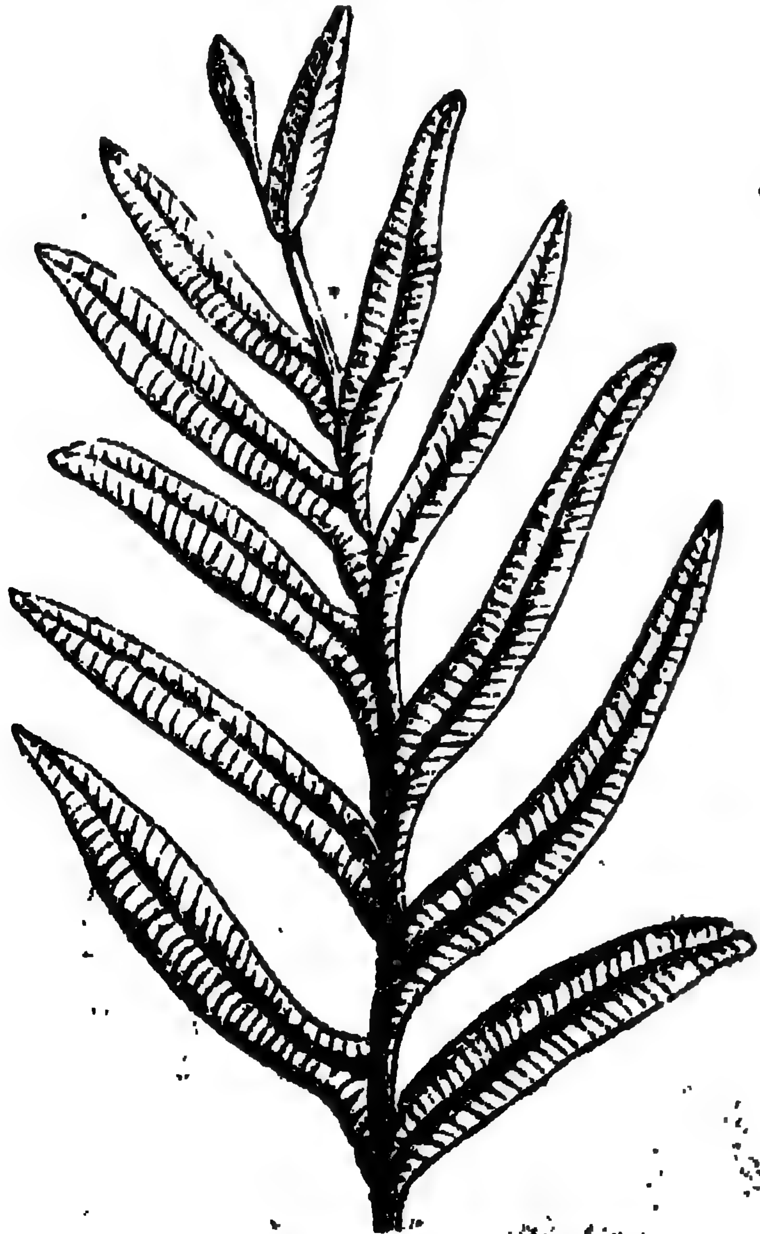
Associated with them are narrow sharp-pointed leaves, resembling scales, which no doubt belonged to them, but which are distinguished by the name of *Lepidophyllum*. In the same formations are found cones of different sizes, consisting of small sharp-pointed lax scales, in the axils of which were seeds: these have been supposed to be the fructification of Lepidodendron, but as there is no actual certainty of the fact, they bear the name of *Lepidostrobi*. The above figure represents Lepidostrobus variabilis.

Lepidodendra are usually quoted as an instance of antient species belonging to the same genus as modern plants of very humble stature (for existing Lycopodia, although they acquire sometimes the length or height of three or four feet

are always more like mosses than trees), having arrived at gigantic dimensions in the remote ages when coal was deposited. But it is highly probable that this notion is altogether unfounded; for, in the first place, there is no certainty whatever that the most gigantic Lepidodendra were not fir-trees, analogous to Araucaria; a conjecture which is rendered the more probable by Mr. Nicol's discovery that some of the specimens of fossil coniferous wood are nearly identical with the wood of that genus. Now the Norfolk Island pine, which is a species of Araucaria, is one of the largest of known trees. In the second place, it has been proved that Lepidodendron Harcourtii at least is not a Lycopodiaceous plant at all, but an extinct genus, intermediate in organization between Coniferæ and Lycopodiaceæ, connecting Gymnosperms and Acrogens more directly and satisfactorily than any known plant. It is impossible to say how many other species of Lepidodendron may not agree with L. Harcourtii, and it must be obvious that, being an extinct form, we have no more reason to be surprised at its being larger than the genus Lycopodium now is, than we should have at finding a tree fern, like Alsophila brunoniana, whose stem is between forty and fifty feet high, in the same natural order with the common Polypodium of our hedges. With regard to the small species of Lepidodendron, it is more probable that they belonged to the genus Lycopodium; but there is nothing remarkable in their stature.

Ferns are the most abundant of all plants in the shale of the coal, almost every yard of it being more or less marked by their impressions, and very often containing them in great multitudes. It has been estimated that of the vegetable remains belonging to the Coal Flora, one-half at least of the species are ferns. They are in most cases destitute of fructification, so that they cannot be arranged according to the system in use for recent species; and consequently M. Adolphe Brongniart, the great writer upon these subjects, has divided them into genera characterized chiefly by the way in which the veins are disposed. The number of ferns renders it convenient that some such classification should be formed, and M. Brongniart's plan has been adopted by all other writers. It is no part of our object to go into such details in this place, but it will be useful to many of our readers to know what the differences are between some of the most common of these fossil genera. Such are the following:—

Pecopteris consists of species whose leaves are once, twice, or thrice pinnated, with the leaflets either adhering by the whole breadth of their base, or by the centre only. The midrib runs quite through to the point, and the veins are planted upon it somewhat perpendicularly.



[Pecopteris lonchitica, a little magnified.]

Neuropteris has leaves divided like those of Pecopteris, but the midrib does not reach the apex of the leaflets; on the contrary, it divides off right and left into veins, and gradually disappears.



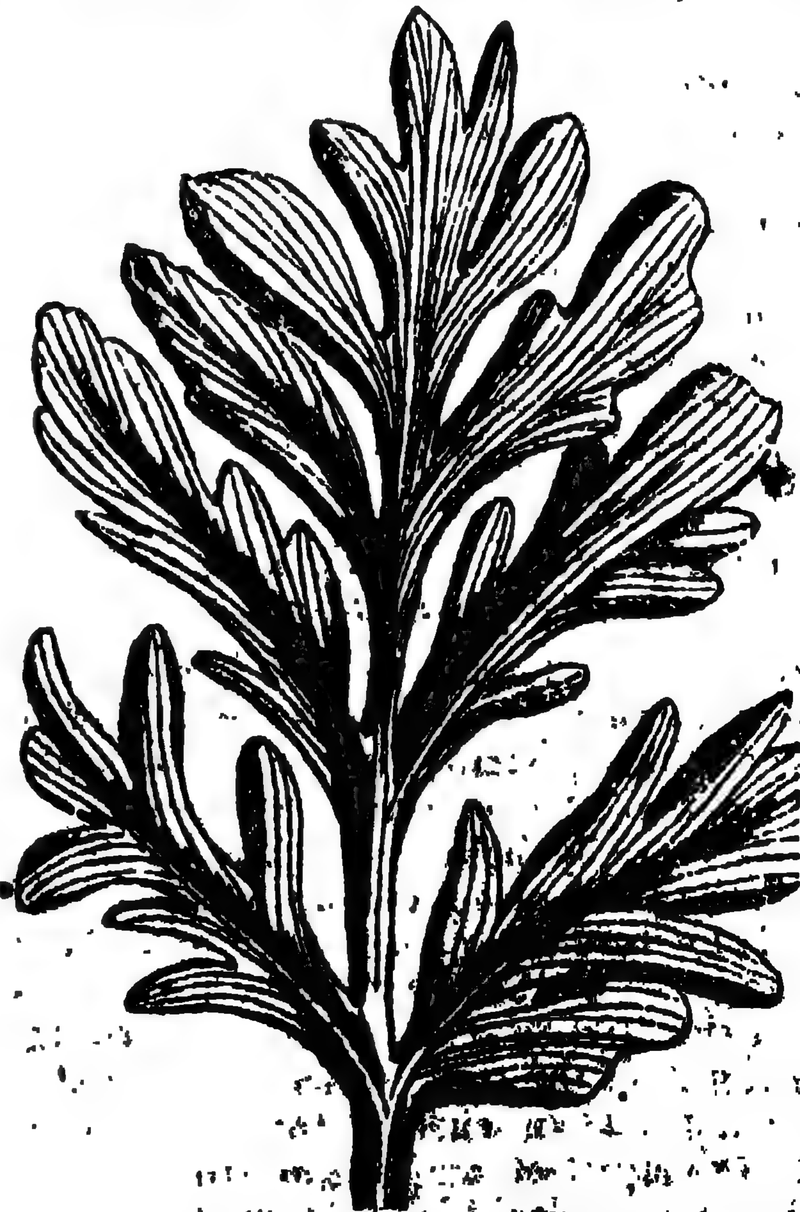
[Neuropteris gigantea.]

Odontopteris has leaves like the last, but its leaflets adhere to the stalk by their whole base; there is no midrib; and the veins spring side by side at once from the base of the leaflet, passing onwards towards the point.



[Odontopteris Brardii.]

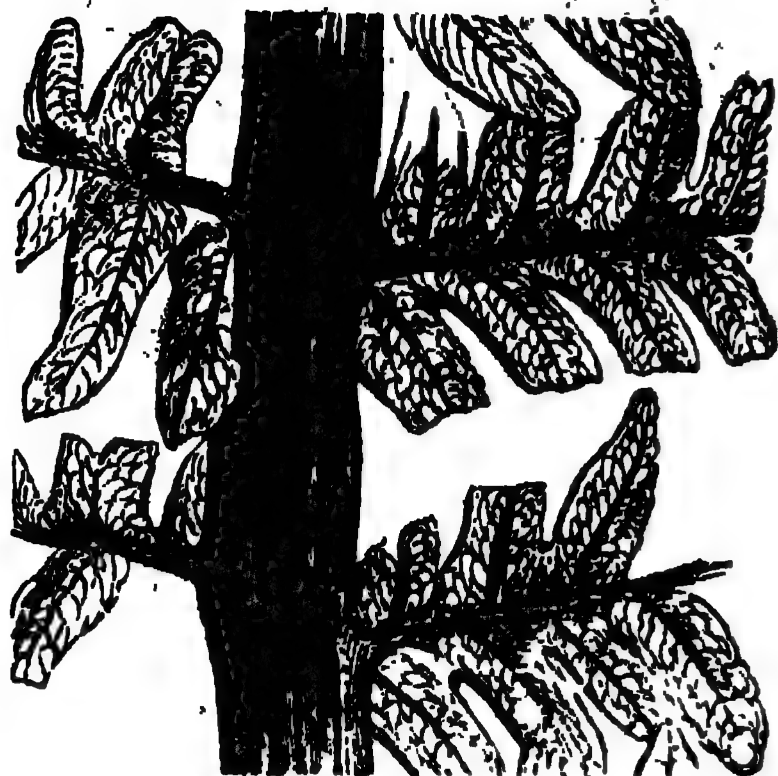
Sphenopteris has twice or thrice pinnatifid leaves; the leaflets are narrowest at the base, and the veins generally



[Sphenopteris artemisiæfolia, magnified.]

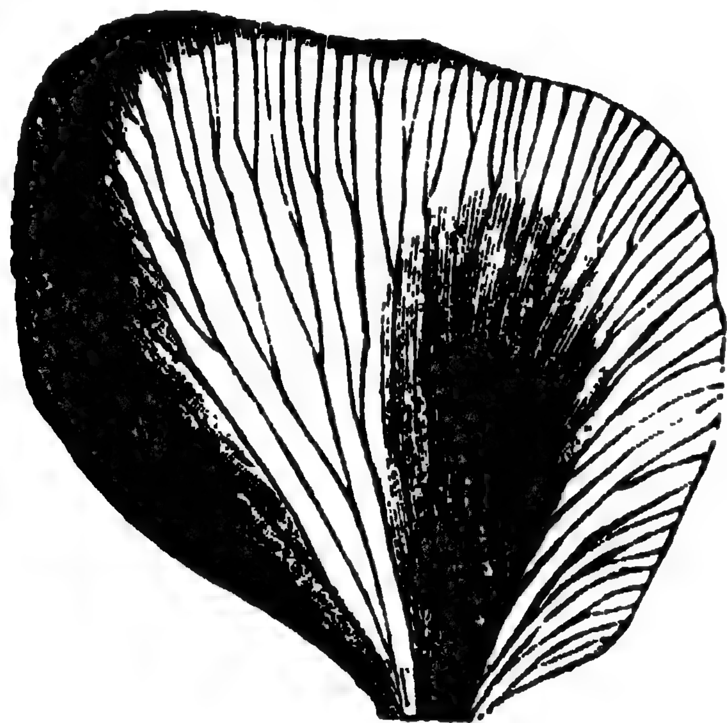
arranged as if they radiated from the base; the leaflets are more frequently wedge-shaped than any other figure.

Lonchopteris has the leaves several times pinnatifid, and the leaflets more or less united to one another at the base; there is a distinct midrib, and the veins are reticulated.



[Lonchopteris Bricii.]

Cyclopteris has the leaves simple, and either altogether undivided, or only lobed at the margin; they are more or less orbicular, and are filled with veins radiating from the base; there is no midrib. Specimens of this genus are common in ironstone nodules.



[Cyclopteris orbicularis.]

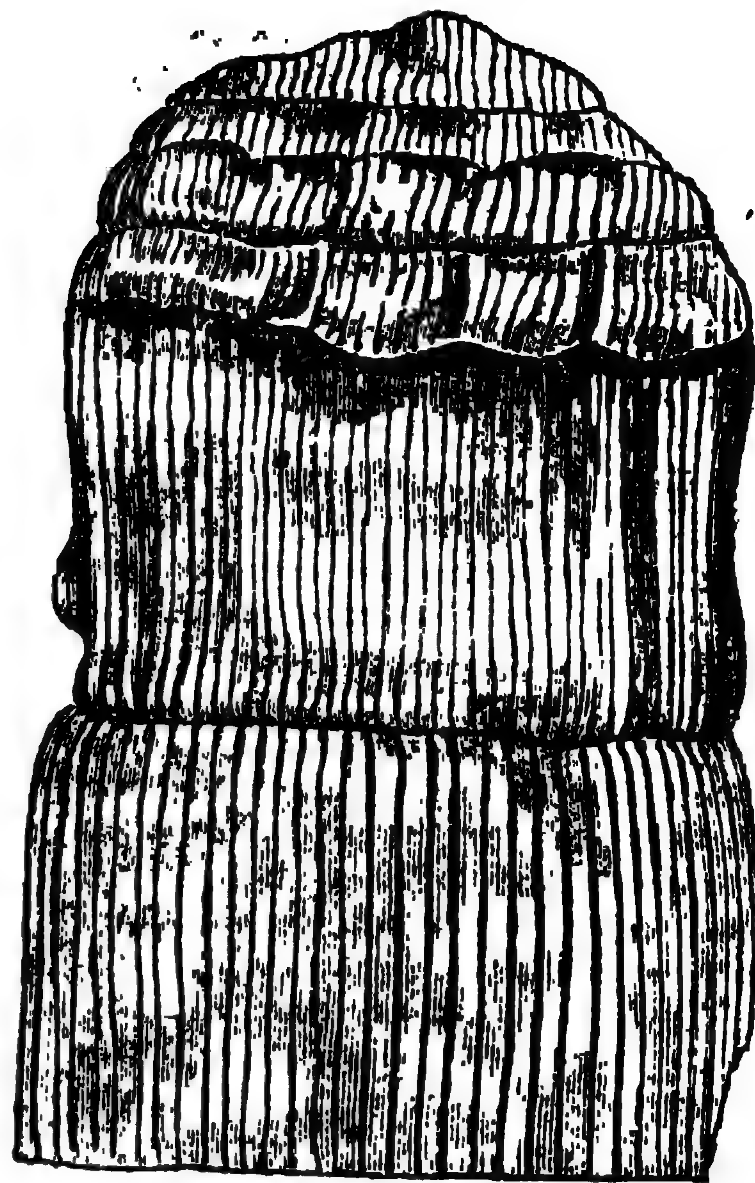
Schizopteris is like the last, except that the leaf is deeply divided into numerous unequal segments, which are usually lobed and taper-pointed.

Under the name of *Caulopteris* are comprehended all the kinds of stems of tree ferns. They are found in the form of short, round, or compressed truncheons, marked externally by oblong scars of considerable size, much wider than the spaces that separate them, and having their surface irregularly interrupted by projecting points. Such appearances are owing to the manner in which the woody parts of the leaf when fresh were connected with the stem. The fragments to which this name is given no doubt belong to leaves bearing other names; but as the stems and leaves are never found united, it is impossible to identify them. Remains of tree-fern stems are of such rare occurrence, that up to the present time not more than two or three specimens have been found in the rich coal-fields of Great Britain.

3. *Coal plants with which no existing analogy has been satisfactorily traced.*

Calamites are fossils found in short, jointed, cylindrical, or compressed fragments, with channels furrowed in their sides, and sometimes partially surrounded by a bituminous coating, the remains of a cortical integument.

They were originally hollow, but the cavity is usually filled up with the substance into which they themselves are converted. They were separable at their articulations, and, when broken across at that part, show a number of striæ originating in the furrows of the sides, and turning inwards towards the centre of the stem, which however they do not reach. It is not known whether this structure was connected with an imperfect diaphragm stretched across the hollow of the stem at each joint, or whether it merely represents the ends of woody plates of which the solid part of



[Calamites dubius.]

the stem was composed. Their extremites have been discovered either to taper gradually to a point, or to end abruptly, the intervals becoming shorter and smaller. The latter are believed to have been the root end of these plants, the others the extremity of their branches. Various speculations upon the nature of these plants are to be found in M. Adolphe Brongniart's works, and in the 'Fossil Flora.' The former botanist concludes that they were plants allied to Equisetum, only of a more gigantic stature. (Equiseta are slender, weak-stemmed, erect plants, not more than two or three feet high; while Calamites have been found with a diameter of fourteen inches.) Later botanists, on the contrary, adduce what they consider ample evidence to show the supposition that Calamites were analogous to Equiseta to be unfounded; and that they more probably were a race of plants which have now become extinct. It is particularly urged that the presence of bark in Calamites, the existence of which M. Adolphe Brongniart admits, is quite conclusive that those plants did not even belong to the same natural class.

Stigmaria is one of the most common of all plants in the coal formation; not a mine is opened, nor a heap of shale thrown out, but there occur fragments of an irregularly compressed roundish form, apparently portions of a stem, marked externally with small cavities in the centre of slight tubercles



[Stigmaria Ficoides.]

arranged irregularly, but somewhat in a quincuncial manner. The axis of these fragments is often hollow, or different in texture from the surrounding part. From the tubercles arise long ribbon-shaped bodies, said to have been traced to the length of 20 feet. For a long time no more was known of these plants. A few years ago Mr. Hutton discovered that such fragments as we have just described are portions of the extremity of the arms of a huge dome-shaped body which divides into twelve limbs, each of which spreads horizontally from the edge of the dome, usually dividing into two arms. From more recent observations it has been ascertained that the arms of this plant consisted of a mass of cellular substance, having in its centre a hollow cylinder composed exclusively of spiral or scalariform vessels, and destitute of medullary processes. It is useless to enumerate the conjectures which have been formed concerning the real nature of this strange production; all that can safely be asserted about it is, that it was unquestionably a vegetable, for even that might have been doubted in the absence of some of the evidence that now exists. We are very much of opinion that it will eventually be ascertained to be something altogether different from any plant with which it has been yet contrasted: see observations further on.

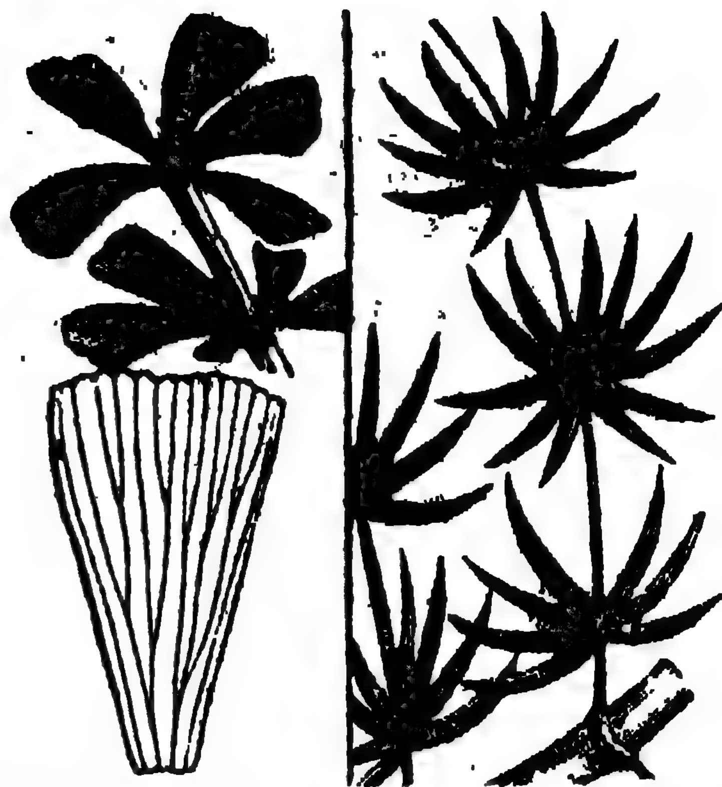
Sigillaria comprehends all those columnar gigantic stems which occur commonly in the sand-stone of the coal in an erect or nearly erect position, but which are prostrate and crushed flat in the coal-shale, and which are marked by flutings with a single row of small scars between them. In diameter they vary from 6 to 36 inches, and they must have sometimes been full 40 or 50 feet high.


[Sigillaria reniformis.]

It is believed, from the very compressed state of many specimens, that these plants must have been of a soft nature, and, from the general absence of scars of large size, that they must have been very little branched. The presence of a distinct bark proves them to have been Exogens of some kind. They have been supposed to be tree-ferns, but that is highly improbable; again, they have been conjectured to be analogous to the torch-thistles (Cacti) of the Tropics, which is far more probable. But in fact no evidence exists upon which a precise opinion can be formed. Is it quite impossible that Sigillarias and Stigmarias are both the same thing, the former being the stem, the latter the roots? Compare with each other tab. 54, the base of *fig.* 1 and *fig.* 2, with tab. 31, *fig.* 2, of the 'Fossil Flora.'

Asterophyllites are very common plants, with narrow pointed, whorled leaves, which vary in figure and in size, but which, together with the slenderness of the stem to which they belong, give the plants much the appearance of the modern genus Galium.

Sphenophyllum, with many of the characters of the last genus, has broad wedge-shaped leaves, the veins of which are forked. That circumstance has led to the notion that it was related to ferns, especially to the genus Marsilea.


[Sphenophyllum Schlothelmii.] [Asterophyllites foliosa.]

Such are the more common of the plants whose remains are traced in the coal-measures. One of the first things which strikes us in casting the eye on the list is the little variety of form apparent in the old Flora. Instead of the infinite diversity of plants which are contained in a modern forest, nothing here presents itself except fir trees, ferns, a very few palms, and a small number of species whose nature is unknown. Not a trace is found of grasses, or the numerous herbs and shrubs that are now met with in all regions clothed with vegetation; and of the vast class of Exogens not one authentic instance occurs. Ferns, too, would seem to have constituted in themselves one-half of the entire Flora, and yet it is only in a few rare cases that they have been met with in a state of fructification. These circumstances have led to the hasty inference that in the beginning nature was in reality but little diversified; that a few forms of organization of the lower kind only were all that clothed the face of the earth; and that it was only in after ages that Nature assumed her many-coloured ever-varying robe. And yet it has been at the same time admitted that in those early days vegetation was more luxuriant and vigorous than at the present hour. It is not a little singular that the true explanation of this circumstance should not have been hit upon without any direct experiment having been instituted for the purpose of demonstrating how it is really to be explained; for considering that all geologists are of accord in the opinion that the plants which formed coal were for a period of some duration floating in water, a partial destruction of them might easily have been supposed to be the result. Professor Lindley has recently proved that plants are capable of enduring suspension in water in very different degrees, some resisting a long suspension almost without change, others rapidly decomposing and disappearing. One hundred and seventy-seven plants were thrown into a vessel containing fresh water; among them were species belonging to the natural orders of which the Flora of the coal-measures consists, and also to the common orders, which, from their general dispersion over the globe at the present day, it might have been expected should be found there. In two years one hundred and twenty-one species had entirely disappeared; and of the fifty-six which still remained, the most perfect specimens were those of coniferous plants, palms, lycopodiaceæ, and the like; thus showing in the clearest manner that the meagre character of the Coal Flora may be owing to the different capabilities of different plants of resisting destruction in water. The same experiment accounts for the want of fructification in fossil ferns; for it showed that one of the consequences of long immersion in water is a destruction of the fructification of those plants.

A much more important fact is the presence of certain tropical forms of vegetation, such as palms and tree-ferns, in the coal; and the quasi-tropical character of other species, as Araucaria-like Coniferæ. This is the more startling when connected with another fact, that the coal-measures of Newcastle are of the same age as those of Newfoundland, and even of Melville Island, in 75° N. lat.

From this it has been inferred that the northern parts of the world enjoyed in remote ages a climate where frost and snow, and the inclement seasons of Arctic regions, were unknown; that they were at least as hot as equinoctial countries now are; and that the inhospitable hyperborean plains of Melville Island at one time displayed the noble scene of a luxuriant and stately vegetation. Palms, it has

been said, were there, and they are the especial and princely denizens of the tropics; tree-ferns occur, and they now only exist in the primeval forests of the torrid zone, haunting their deepest recesses, breathing a damp and equable atmosphere, and living, like vegetable eremites, without even a parasite to fix itself upon their trunks and keep them company. Stigmarias, Sigillarias, and even Calamites, have been enlisted in the cause of this theory, notwithstanding that no one can say what they may have been. And in confirmation of all this, the preponderance of ferns has been appealed to as having its parallel no where except in the hottest and dampest islands of Polynesia.

The advocates of these opinions have not however been permitted to hold their ground in peace. It has been asserted that the presence of these tropical forms of vegetation in northern latitudes is no proof of what the climate in which they were deposited formerly was, because they may have been drifted to their present situations by currents. The perfect state of many of the remains offers however great difficulties in the way of this supposition; for although they are very much broken, yet the angles of most fossil plants are by no means water worn, and in Sigillarias, &c., are as sharp as they ever were. Nor is the state of those tropical stems and fruits, which in modern times reach the coasts of Ireland and Norway, at all like that of the buried plants of the coal-measures.

Another difficulty in the way of admitting a high temperature in northern regions in former days is suggested by considering the duration of the days. Without a diurnal change of light and darkness plants cannot exist: absence of light blanches them, by the accumulation of undecomposed carbonic acid; absence of darkness destroys or dwarfs and deforms them, by the incessant decomposition of their carbonic acid. Now, however this may be reconciled with a country like England, in which the winter days are of moderate length, it is less reconcilable with the northern parts of North America, and not at all with Melville Island, in which there are 94 days when the sun is never above the horizon, and 104 days that he never sets; and it will hardly satisfy the objection to call in the aid of long-continued auroræ boreales, because it is solar light, and solar light only, which, so far as we know, will stimulate the digestive functions of plants. To admit therefore the presence of a tropical vegetation in former days in Melville Island, or Baffin's Bay, seems to carry with it the necessity of also admitting that a change has occurred in the position of the earth's axis of rotation—an assumption for which we have no evidence at all.

These points were adverted to in a lecture given by Professor Lindley at the London University on the 16th March, 1836, and at the same time some views of his own were sketched out, with which we conclude the present article.

He, in the first place, adopted entirely the opinion that the plants of the English coal-measures had not been drifted from any considerable distance, but had grown at the most within a few hundred miles of the places where they are now deposited, and probably in their very vicinity. But from this statement was excepted the coal of Melville Island; for he asserted that, although the vegetable impressions in the English coal-measures were by no means water worn, yet those in the British Museum from Melville Island were so rubbed and damaged, that they might have travelled from the very equator before they were deposited. This rendered it unnecessary to discuss the question of the possibility of plants growing without light under a supposed high temperature, and to a considerable size, because it cannot be denied that an English winter at the present day has light enough to answer all the purposes of a vigorous vegetation; and the same is true of Newfoundland, and those parts of the United States of America in which the coal plants are most unequivocally of the same nature as those of Newcastle.

The great point for consideration was the evidence which, it is asserted, the coal-measure plants afford of the climate of Great Britain, and the north of Europe generally, having formerly been tropical. This opinion has been founded upon three classes of facts, each of which requires separate examination; the one, the excessive development of certain forms of vegetation; another, the presence of the remains of palms and tree-ferns, which are usually considered incapable of existing unless in a tropical atmosphere; the third, the excessive disproportion of ferns to other plants.

Sigillarias, Stigmarias, Lepidodendra, and Calamites, have been asserted to be enormous forms of natural orders, now known only in a comparatively pigmy state. Sigillarias have been called huge tree-ferns, Stigmarias and Lepidodendra have been described as gigantic Lycopodiaceæ, and Calamites have been considered an excessively developed ultra-tropical form of Equisetum. But these assertions are of the most gratuitous kind, and are incapable of being maintained upon admissible botanical reasoning. Whatever Sigillarias, Stigmarias, and Calamites may really have been, there is no reason for supposing them either related to tree-ferns, Lycopodia, or Horsetails; and Lepidodendron has been demonstrated to have been a genus intermediate between Lycopodia and fir-trees. It is almost certain that all these plants are in reality destitute of living analogies; and therefore as we do not know what they were, we have no means of judging what kind of climate they required. Supposing that some of the Lepidodendra were closely allied to the modern genus Araucaria, as is highly probable, yet that fact does not afford any proof of a tropical climate; for Araucaria Dombeyi now inhabits the cold mountains of Southern Chile, and is at this day uninjured in the severest of our English winters; while Cunninghamia sinensis, and species of Callitris or Dacrydium, with which other remains of Lepidodendra may be compared, although not European, are by no means of tropical habits, but are found on the mountains of New Zealand and Van Diemen's Land, where they are exposed to a far from temperate climate. Moreover Salisburia adiantifolia, which would certainly be considered a tropical form of Coniferæ, if found in an extinct state only, is one of the hardiest of trees, and a native of the rigorous climate of Japan. Further than this, it was observed that supposing Sigillarias and Stigmarias could be found to have been succulent plants, allied to Cacteæ or Euphorbiaceæ, as some think, still no real evidence of their having required a tropical climate for their development would be afforded by them, because there is nothing in the mere organization of succulent plants which unfits them for cold climates. A capability of enduring cold is something immaterial and independent of organization, about which nothing can be judged *à priori*: for turnips, cabbages, Jerusalem artichokes, houseleek, and many other hardy plants, are in parts as succulent as Cacteæ. All arguments therefore to prove that the north of Europe was formerly tropical, deduced from the presence of such plants as those now mentioned, are inadmissible.

Nor are those derived from the presence of palms and tree-ferns of much greater force. For, in the first place, it is to be remembered that such remains are exceedingly rare; secondly, that they are much damaged, as if they had been dashed about a good deal before they were deposited; and thirdly, that such plants are among those which are capable of resisting the action of water for a considerable period. Independently however of these considerations, there are others which are of more importance. Neither palms nor tree-ferns are exclusively tropical: it is true that at the present day the principal part of such species do inhabit the tropics, but there is a sufficient number of exceptions to justify the opinion that others may have existed of still more hardy habits. To say nothing of the date-palm itself, which is cultivated in Sicily, and even at Bordighiera, in Liguria; or of the palmetto (Chamærops humilis), found as far north as Nice; or of the New Zealand Areca, which is seen in places where the ground is sometimes covered with snow for several days; or of the doubtful Palma magellanica, which Humboldt states certain Spanish voyagers to have seen in 53° S. lat.—there is the gigantic wax-palm of the Andes [CEROXYLON], which rears its lofty trunk in climates too inhospitable for any other palm. It is chiefly, says Bonpland, among the snow-clad summits of Tolima, San Juan, and Quindiu, that this palm occurs. 'The elevation above the sea of this species presents a very striking phenomenon with reference to botanical geography. Usually in the tropics, palms are not found at elevations exceeding 3000 feet, the cold of higher regions preventing them from approaching nearer to the limits of perpetual snow. The palm of Quindiu offers a very rare exception to this law of nature. It is hardly seen in the plains; it first begins to appear at an elevation of 5400 feet, which is about that of the Puy de Dôme, or the Passage of Mont Cenis. It therefore appears to shun the excessive heats of less elevated localities. Its lowest limit is higher than that of the Cinchona. We observed it plentifully at the height of

5700 feet, which is 6000 feet higher than species of palms are usually met with, and not more than 2400 feet from the region where the soil is occasionally covered with snow.' (Humb. and Bonp., *Pl. Æquinoct.*, vol. i.)

As for tree ferns, we have them in New Zealand, and especially on the south side of Van Diemen's Land, where the mean temperature probably does not exceed 54° Fahrenheit. So that, all things considered, it is by no means safe to take the remains of these plants as good evidence of a tropical climate, or indeed of a climate materially unlike that which we now experience.

The only remaining argument to be considered is that derived from the great preponderance of ferns in the Coal Flora. It is said by Adolphe Brongniart, that as it is only in damp tropical regions that we now find ferns equal in the number of their species to all the species of other plants, and as this same proportion is found in the Coal Flora, that therefore the climate under which the Coal Flora was produced must have been damp and tropical. But as, by the experiment already mentioned, it was shown that when a given number of plants of entirely different habits are plunged into the same vessel of water, by far the greater part is decomposed before ferns begin to be affected, it is obvious that no estimate of what the proportion of ferns to other plants really was can now be formed; and consequently this argument also falls to the ground.

These statements must, we think, render it apparent that geologists have been too hasty in coming to the conclusion that the north of Europe was formerly tropical; and that if the facts we actually possess are soberly examined, they do not amount to more than this:

1. That coal is of vegetable origin.
2. That at the period of its deposit, the earth was covered with a rich vegetation, of which only a small portion has been preserved, and that of this portion all the species and several of the races are totally unknown at the present day.
3. That the climate may possibly have been something milder than it now is, but that there is no evidence in the vegetable kingdom to show that it was materially different from that of the present day.

It may possibly have been expected that in the course of these remarks we should have touched upon the modern theory that species have been gradually becoming more and more completely organized from the earliest period of the creation to the present day; that the simplest forms were those which first appeared; that they were succeeded by others of a more complicated structure, and that it is only in these later days that the most perfectly constructed species have appeared. Upon this subject we have only to remark, that so far as the vegetable kingdom is concerned, the theory is not supported by a shade of evidence; and we therefore do not think it necessary to give it further notice.

COAL TRADE. The quantity of coals shipped coastwise from ports of Great Britain to other ports of Great Britain and to Ireland amounted, in the year 1835, to 6,117,993 tons; and the quantity exported to the British colonies and to foreign countries, in the same year, was 736,060 tons; making an aggregate of 6,854,053 tons of coals sea-borne from the maritime districts. The market of London alone required a supply of 2,298,811 tons, for the conveyance of which 7958 ships (which make repeated voyages) were employed. The great towns of Lancashire, of the three Ridings of Yorkshire, of Nottinghamshire, Derbyshire, Leicestershire, Warwickshire, and Staffordshire, are supplied by canals or by land-carriage from collieries in the respective counties here enumerated. In 1816 a committee of the coal-owners of Northumberland and Durham was commissioned to inquire as to the quantity of coals then sent by inland navigation and by land-carriage to different parts of the kingdom. The result of their inquiries was that 10,808,046 tons were annually so sent. There can be no doubt that if this estimate were correct at the time, the quantity must have been greatly increased during the last twenty years. In estimating the annual consumption of the country, it is also necessary to take into account the quantities used upon the spots where the collieries are situated. The town of Sheffield alone requires for manufacturing and domestic purposes more than half a million of tons annually drawn from collieries on the spot; and it has been estimated that the iron-works of Great Britain, most of which are situated in spots where coal is found, require every year, for smelting the ore and converting the raw material into bars, plates, &c., more than five millions of tons. The total consumption of coals within the United Kingdom has been variously stated at from fifteen to thirty millions of tons per annum; recent parliamentary inquiries lead us to conclude that the larger estimate is not much, if at all, exaggerated. Mr. Taylor, whose experience in the various branches of mining operations is equal to that of any person living, has given the following estimate, which agrees substantially with estimates formed by Mr. Stevenson and Mr. Bakewell, previously to the inquiries to which reference has just been made:—

	Tons.
'The annual vend of coals carried coastwise from Durham and Northumberland is . .	3,300,000
Home consumption, say one-fifth . .	660,000
	3,960,000
Which quantity supplies about 5,000,000 persons; and supposing the whole population of Great Britain to be 15,000,000, this must be trebled; for though these two-thirds of population are perhaps less able to afford fuel, yet, taking into consideration the manufacturing districts and the cheapness of coal in the interior, the estimate will not be too high .	11,880,000
Consumed by iron-works, say 600,000 tons of metal, to produce which requires at least four times the quantity of coal in making even pig metal; and the extraordinary consumption in the Cornwall, &c. mines . .	3,000,000
Consumed in Great Britain . . .	14,880,000
Exported to Ireland, say . . .	700,000
Total tons, exclusive of foreign exportation	15,580,000'

It is probable that the foregoing estimate is considerably short of the present consumption, which has increased with the increasing population, and with the growth of the manufacturing interests. The following estimate, which can still only be offered as an approximation, is made upon the same principle as that assumed by Mr. Taylor, but applying to it the actual quantities ascertained from recent parliamentary returns:—

	Tons.
The quantity of coals carried coastwise from Durham and Northumberland, in 1835, was	43,68,144
Home consumption, one-fifth, which is probably much under the truth, from the recent multiplication, in those counties, of manufactures in which the cost of fuel is a principal consideration	873,629
	5,241,773
This quantity trebled, upon the principle assumed by Mr. Taylor, will amount to	15,725,319
Consumed by iron-works and mines, double the quantity estimated by Mr. Taylor, who has taken no account of that consumption as regards iron-works beyond the first process, in which alone, because of increased production, the full allowance of 3,000,000 tons are now used, say	6,000,000
Consumed by Great Britain . .	21,725,319
The shipments to Ireland in 1829, the last year as to which any specific parliamentary return has been made, were 840,246 tons. These shipments had then (1829) been for some years steadily increasing at the rate of 100,000 tons annually; and as the causes for that increase have since continued to operate, it may be fairly assumed that the shipments now amount to	1,000,000
Waste by screening, as explained below . .	6,628,218
Total, exclusive of foreign exportation . .	29,353,537

It was long considered politic to check the exportation of coals to other countries, both through fear of exhausting the mines, and because it was imagined that our superiority as manufacturers might be endangered. A heavy export duty was accordingly levied, amounting to 17*s.* the chaldron Newcastle measure, or 6*s.* 5*d.* per ton upon large, and 4*s.* 6*d.* the chaldron, or 1*s.* 8*d.* per ton, upon small coals.

In 1831 these duties were modified to 3*s.* 4*d.* per ton upon large, and 2*s.* per ton upon small coals; and in 1835 they were repealed, with the exception of an ad valorem duty of 10*s.* per cent. A considerable revenue was for many years raised from all coal carried coastwise by sea from one part of the kingdom to another. When first imposed, in the reign of William III., this tax was 5*s.* per chaldron, but was raised during the war of the French revolution to 9*s.* 4*d.*, at which rate it was continued until 1824; it was then reduced to 6*s.*, and in 1831 was wholly repealed. Although the government has remedied the evil so far as the public revenue is concerned, the consumer is still burthened in some places with local or municipal duties, &c. Thus in the city of London the corporation was empowered, by the Acts 10 Geo. IV., c. 136, and 11 Geo. IV., c. 64, to levy eight pence per ton 'for providing for the payment of the interest and ultimate liquidation of monies borrowed for making the approaches to London bridge.' One penny per ton is also levied under the Act 47 Geo. III. for establishing a market for the sale of coals; and under the Act 1 and 2 William IV., c. 76, four pence per ton 'for metage by prescription and charters,' making together 1*s.* 1*d.* per ton upon all coals brought coastwise to the port of London. By letters patent granted by Charles II., the duke of Richmond was entitled to receive 1*s.* per chaldron, Newcastle measure, on all coals shipped in the river Tyne to be consumed in England; and on the average of ten years ending 1799, the amount of that duty had been 21,000*l.* a year. On the 19th of August, 1799, the Treasury agreed with the duke for the purchase of this duty by an annuity of 19,000*l.*, which sum was charged upon the consolidated fund, to be paid quarterly. The sum issued by the Exchequer at three several periods for the purchase of a perpetual annuity of 19,000*l.* instead of those Exchequer payments was 490,833*l.* 11*s.* 6*d.*; but the bargain has proved by no means an improvident one on the part of the public, the sums received by the Custom House, as the representative of the duke of Richmond, from August, 1799, up to March, 1831, when all coasting duties ceased, having exceeded the payments made from the Exchequer by 315,000*l.* The total revenue derived from the coasting duties on coals in 1830, the year preceding its repeal, was 1,021,862*l.*

The quantity and declared value of coals, culm, and cinders exported from the United Kingdom to British colonies and foreign countries, in each year from 1827 to 1835, have been as follows:—

	Tons.	£.		Tons.	£.
1827	368,679	153,387	1832	588,416	228,615
1828	357,864	145,943	1833	634,448	231,314
1829	371,271	147,309	1834	615,255	220,746
1830	504,419	184,464	1835	736,060	244,898
1831	510,831	199,760			

The British colonies and foreign countries to which shipments were made in 1835, together with the quantity and value sent to each, were as follows:—

	Tons.	Value.		Tons.	Value.
Russia	42,061	£. 11,425	Mauritius	1,039	£. 650
Norway	5,602	1,697	East India Company's Territories and Ceylon	2,775	1,784
Sweden	16,076	3,741	Indian Islands	126	50
Denmark	83,109	20,658	Philippine Islands	201	126
Prussia	43,675	9,336	China	429	175
Germany	66,055	15,177	N. S. Wales and V. D. Land	20	8
Holland	115,138	35,032	Brit. N. A. Colonies	38,565	16,359
Belgium	699	178	Brit. W. Indies	61,054	36,872
France	104,138	31,647	Hayti	43	23
Portugal	11,981	2,894	Cuba and Foreign W. Indies	339	52
Spain	2,393	1,049	United States of America	19,585	10,015
Gibraltar	8,373	3,145	Mexico	11	5
Italy	8,377	3,320	Brasil	5,352	2,043
Malta	4,865	1,833	Rio de la Plata	1,544	751
Ionian Islands	3,004	1,291	Chili	137	82
Turkey and Continental Greece	6,098	2,301	Peru	58	43
Morea and Greek Islands	60	20	Guernsey, Jersey, Alderney, and Man	68,482	25,154
Egypt	6,910	2,589			
Tripoli, Barbary, and Morocco	5,154	1,770			
W. Coast of Africa	30	25			
Cape of Good Hope	1,828	1,021			
Saint Helena	297	270			

The owners of the greater part of the collieries in the counties of Durham and Northumberland have entered into a mutual agreement under the denomination of 'The Limitation of the Vends,' which has continued in operation with some interruptions from the year 1771 to the present time. The object of this compact is to apportion among the different collieries the quantity to be raised and sold, according to the quality of the coal and the power of raising it, and with reference also to the probable demands of the different markets in the kingdom. The nature of the regulation was explained by Mr. Brandling to a committee of the House of Commons, in 1830, in the following terms:—

'When it is understood by the coal-owners that all the parties interested in the coal trade on the Tyne and Wear are willing to enter into an arrangement of this nature, a representative is named for each of the collieries; these representatives meet together, and from amongst them choose a committee of nine for the Tyne, and seven for the Wear. This being done, the proprietors of the best coals are called upon to name the price at which they intend to sell their coals for the succeeding twelve months; according to this price the remaining proprietors fix their prices: this being accomplished, each colliery is requested to send in a statement of the different sorts of coal they raise, and the powers of the colliery, that is, the quantity that each particular colliery could raise at full work; and upon these statements the committee, assuming an imaginary basis, fix the relative proportions as to quantity between all the collieries, which proportions are observed, whatever quantity the markets may demand. The committee then meet once a month, and according to the probable demand of the ensuing month they issue so much per 1000 to the different collieries; that is, if they give me an imaginary basis of 30,000, and my neighbour 20,000, according to the quality of our coals and our power of raising them in the monthly quantity, if they issue 100 to the 1000, I raise and sell 3000 during the month, and my neighbour 2000; but in fixing the relative quantities, if we take 800,000 chaldrons as the probable demand of the different markets for the year, if the markets should require more, an increased quantity would be given out monthly, so as to raise the annual quantity to meet the demand, were it double the original quantity assumed.'

The single circumstance upon which the committee forms its estimate of the quantity to be issued, is the price in the London market. If this has been greater during the previous month than the price fixed by the coal-owners, as already explained, added to the freight and other charges of conveyance to London, permission is given to raise a larger quantity; and on the contrary, if the price has been below a remunerative one, thus calculated, then the supply is limited till the requisite price is reached. In the agreement entered into among the owners of collieries, it is stipulated that no one without leave of the committee shall sell below the fixed price agreed on as the price to be charged by such colliery, under a penalty of 5*s.* for every chaldron so sold in excess: and every colliery giving overweight, and in that way evading the terms of the agreement, is to forfeit 2*s.* 6*d.* for every hundredweight of excess. It has been usual for each of the parties to deposit in the hands of the chairman of the committee a promissory note for a considerable amount, proportioned to the quantity allotted as the annual vend of the particular colliery, as a security for the payment of any fines that may be incurred; but during the last two years this part of the plan has not been insisted on.

This combination on the part of the coal-owners is defended on the plea that if through the free competition of the collieries a glut should be created in the market, so that any great reduction in the price should be occasioned, many of the collieries must soon cease to be worked: the effect of which would be, that those collieries which should survive the shock would then raise the price so as to indemnify themselves for the loss they may have sustained, by which means the consumer might be permanently injured. In support of this position, it is urged that in those years when the trade was free, low prices uniformly prevailed to such a degree as to involve the coal-owners in great losses, which must have ruined the weak parties, and have led to the results just described, had not the whole body felt it much for their advantage again to have recourse to the regulation of the vend. It seems however that the competition of coal-owners in other districts, when there is any failure of supply from Durham and Northumberland, would, in a considerable degree, prevent that great rise in price which has been looked for as an indemnification for previous losses. The regulation made by the committee for the year 1828 fixed the prices too high, the consequence of which was an immediate influx of coals from Scotland, Wales, and Yorkshire, into London; so that when the engagement was entered into for 1829, the price was fixed 1*s.* per chaldron lower. Had this reduction been made at first, it might

have prevented the competition, which, having been once created, still exists, and has been constantly increasing. The existence of competitors, who are continually creating greater facility of communication with the great London market, must in time altogether break up the monopoly which the coal-owners of Durham and Northumberland are attempting to perpetuate. The manner and degree in which the consumers, and especially the London consumers, of the coals of Durham and Northumberland are affected by the regulation of the vend, and the impolicy to the coal-owners themselves of its continuance, may be understood from the evidence of Mr. Wood, the managing partner in an extensive colliery, given before a committee of the House of Commons, in June, 1836. Mr. Wood is of opinion, 'that the effect of the regulation is, that an inferior coal is sold at the price a better one would be supplied at in an open trade; that by abolishing the regulation the present price would be reduced 1*s.* 6*d.* per ton by the coal-owner, and many of the inferior sorts, in that case, could not be worked at a profit; there would consequently be a larger proportion of good coals, and not so much risk of admixture as at the present time; that there are no peculiarities in the coal market to prevent its adjusting itself to an open trade; no peculiarity in the application of capital in the coal trade to prevent a regular and ample supply: that an open trade would urge to economy in working; and as a case in point, he states that the manager of a colliery who in 1827 thought that the price of 24*s.* per Newcastle chaldron was the lowest at which he could supply them, now sells the same coals at 17*s.* 6*d.*; that in fact a low steady price would be ultimately better for the coal-owner than the great changes which have taken place. Under an open trade, he doubts whether there would be any profit for some time; but it would settle down to a remunerative price, as all other trades do, and the supply would then be made by those who could sell the best coals cheapest; that the best effects would follow from the most unrestricted and free exercise of every man's discretion in conducting his own trade, both at the place of purchase and of sale: and that the present prices leave an extravagant profit to the coal-owners; more than a fair remuneration.'

Another regulation affecting the coal trade from the Tyne and the Wear has been established by Act of Parliament (6 Geo. IV. c. 32), under the provisions of which every ship must be loaded in her turn; and if any colliery refuse to sell, a penalty is imposed of 100*l.*; but this regulation may be and has been evaded by the coal-owners towards ships the owners of which refuse to be bound by their regulations in the port of discharge, and the mode of evading it is to fix an exorbitant price upon their coal, which may be done although a price below the regulation is not allowed, and by this means the vessels are either brought into conformity with the regulations in the port of discharge, or forced out of the trade. The regulations here alluded to were made in June, 1834, at a meeting of the coal-factors in London, and are to this effect:—'That whenever a greater number than eighty ships reach market on any one day, the factors shall offer them for sale according to the rotation of entry; and that not more than forty of such ships shall be offered for sale on one market-day, unless the prices of best coals be 20*s.* or upwards, and in that case to be at liberty to sell such further number of ships as each factor may think proper, giving to every vessel with the same coals her fair and regular turn of sale, by which arrangements the ships will experience little or no detention, and the evil be avoided of pressing for sale at a reduced price a larger quantity of coals than the average demand of the market requires.' This rule was altered as follows in January, 1835, as far as regards the number of ships, the cargoes of which may be offered for sale in one market-day:—

'When the price of the best Sunderland coals has been on the previous market-day 21*s.* or less, the number of cargoes to be offered for sale shall be .. 40

When 21*s.* 3*d.* or 21*s.* 6*d.*	50
21*s.* 9*d.* or 22*s.*	60
22*s.* 3*d.*	70.'

Some alteration has since been made in this scale, but on the 3rd of March, 1836, it was again adopted, and has since been acted upon. Vessels loaded with coal for gas companies begin to work upon arrival, and also all vessels whose cargoes are for the use of the Government.

The effect of the regulation which fixes the minimum prices at which the different qualities of coals are to be sold, is further injurious to the public, because, in order to raise the actual value more nearly to the prescribed rates, it induces the owners to screen the coal. By thus separating the least valuable part an immense waste is occasioned. The managers of collieries sell as much of the small coal as possible at the mouth of the pit; but the demand being necessarily limited to the wants of the surrounding district, a great proportion is wholly unsaleable, and is actually set on fire to clear the ground. This loss would of course be saved if the trade were made permanently free. The waste by screening is said to be always from one-fourth to one-third of the total quantity raised, and was greater even than this proportion before January, 1832, when the sale of coals by measure was abolished in and about London. Coals that are shipped to other parts, or exported to foreign countries, are less screened than those sent to London, and are consequently sold at 4*s.* to 6*s.* per chaldron cheaper.

The number of collieries on the Tyne,		No. included in regulation.
in June, 1836, was ..	47 ..	41
on the Wear	17 ..	9
on the Tees	16 ..	9

The basis of the regulation for the vend, as settled in the preceding April, was—

		Tons.
on the Tyne 959,500	Newcastle chal., or	2,542,675
on the Wear 564,000	"	1,494,600
on the Tees 176,000	"	466,400

The coals sent from the Tees are all carried down from the collieries to the place of shipment by the Stockton and Darlington Railway. When this work was first projected, the coal-owners of Newcastle and the Wear petitioned against it on the ground that it would exonerate the owners of the collieries through or near to which it was to pass from a great portion of the expense of transport to the ship. Their opposition at that time was fruitless; but, acting upon the same principle, a meeting of the coal-owners of the Tyne, Wear, and Tees, was held at Newcastle in April, 1836, at which it was determined to oppose the progress of the Durham Junction and South Durham Railway bills, and a subscription was entered into to defray the expense of such opposition. These bills were both thrown out by the House of Lords.

The following statement shows the price per ton of the best Newcastle and Sunderland coals at the place of shipment and in London, in June and July of each year from 1813 to 1835:

	Year.	Price at Newcastle.	Price in London.		Year.	Price at Newcastle.	Price in London.
Duty 7*s.* 6*d.* per Ton.	1813	13*s.* 0*d.*	42*s.* 0*d*	Duty 4*s.* per Ton.	1824	13*s.* 0*d.*	33*s.* 4*d*
	1814	13 0	44 8		1825	12 8	23 6
	1815	13 0	30 0		1826	13 6	25 3
	1816	13 0	34 8		1827	13 6	28 3
	1817	13 0	31 9		1828	13 6	27 6
	1818	13 0	32 9		1829	12 9	28 6
	1819	13 0	30 7		1830	12 4	27 6
	1820	13 0	30 7	Duty repealed.	1831	12 4	22 9
	1821	12 8	32 6		1832	12 3	19 6
	1822	11 11	30 4		1833	10 6	15 9
	1823	12 8	33 4		1834	10 9	19 0
					1835	11 0	20 3

The charges upon the transmission of a cargo of coals from Sunderland and upon the delivery in London, as well as the proportions in which the price paid by the dealer is divided between the coal-owner and the ship-owner, will be seen in the following account sales: viz.,

	£. s. d.	£ s. d.
Night office and entry	0 4 6	
City dues on 298 tons, at 1*s.* 1*d.* per ton . .	16 2 10	
Metage on 293 tons, at 3*d.* (half borne by ship-owners)	1 16 7	
		18 3 11
Tret, discount, and scorage, allowed the buyer .		9 6 6
Factorage, 3*d.* per ton	3 13 3	
Del Credere commission, 10*s.* per cent. . .	1 10 11	
		5 4 2
Insurance 160*l.*, at 15*s.* per cent. . . .	1 4 0	
Policy duty	0 2 6	
		1 6 6
		34 1 1
Paid coal-owner for 112 chaldrons of 53 cwt., at 28*s.* 6*d.* per chaldron (10*s.* 9*d.* per ton) . .		159 12 0
Balance for freight to the ship on 293 tons .		115 15 11
		309 9 0
293 tons sold at 21*s.* per ton, with 1½*d.* per ton metage		£309 9 0

Out of the freight, which in this case amounted to 7*s.* 11*d.* per ton, the ship-owner had to pay 9*d.* per ton delivery charges, and 1½*d.* per ton half metage.

The quantity of coals and the number of ships, including their repeated voyages, in which the same was brought into

the port of London in each year from 1825 to 1835, were as follows:—

Years.	Ships.	Tons.	Years.	Ships.	Tons.
1825	6,564	1,856,606	1831	7,006	2,045,299
1826	6,810	2,040,291	1832	7,528	2,139,078
1827	6,491	1,682,321	1833	7,077	2,010,409
1828	6,750	1,960,569	1834	7,404	2,078,685
1829	6,999	2,018,975	1835	7,958	2,298,812
1830	7,108	2,079,275			

The ports from which the above shipments were made in 1835 were—

	Ships.	Tons.
Newcastle	3,897	1,206,300
Sunderland	2,182	629,544
Stockton	965	229,885
Blyth	251	65,046
Scotland	249	40,955
Wales	142	35,420
Yorkshire	251	27,394
Sundry Places	6	367
Small Coal	4	744
Culm	11	3,147
	7,958	2,298,812

COALBROOK DALE. [COAL.]

COAST, GOLD, is a part of Upper Guinea, but its boundary is not exactly determined. Geographers state that Cape Three Points (2° 30′ W. long.) constitutes its western boundary; but our navigators extend it farther west to the small river Assinee (about 5° W. long.), nearly 70 miles east of Cape Lahoo. On the east, the eastern mouth of the river Lagos (4° 20′ E. long.) is generally considered as constituting its boundary towards Benin, though the most eastern districts are often distinguished by the name of the Slave Coast. In the interior are the powerful kingdoms of the Ashantees and Dahomey, on which most of the small states along the coast are dependent.

Nearly in the centre of the coast is the English fortress of Accra. The country west of it has an undulating surface, with a small proportion of level ground: the hills are covered with shrubs and timber of small growth. The coast, though rarely high, is rocky and bold. At Accra the low country begins, and extends without interruption to the eastern boundary and still farther. It is a fertile, open, and level plain, which contains extensive savannahs covered with high grass; but in some parts it is thickly wooded with fine trees. The shores here are flat and sandy. There are no harbours along the whole line of the coast, not even for vessels of a moderate size; and as the surf is very violent, the trading vessels are obliged to anchor four or six miles from the beach. In many places landing can only be effected in calm weather; in others there are reefs, from 100 to 1000 yards from the shore, upon which the surf breaks its force, and consequently the intermediate space offers facility for landing at all times. The principal European settlements are built near such places.

The whole of this coast being near 5° N. lat., is considered one of the hottest countries on the globe; yet, according to Adams, the mean temperature is only 78°, and in the cold season the thermometer sometimes falls to 73° or 74°. Monrad also states, that on the coast it rarely attains 90°, though in the interior it reaches 94° or 95°, and in some ill-ventilated places even 100°. This comparatively low degree of heat is attributed to the circumstance that the sky is nearly always clouded. Adams says that the prevailing south-western and western winds load the atmosphere with moisture, so as to give it a haziness, which diminishes the intensity of the sun's rays and renders them more supportable than in the West Indies, where the sun shines with a brilliancy seldom seen in this part of Africa. Monrad attributes the same haziness during the eastern winds to a fine dust with which the air is filled. It is further observed, that the nights are commonly cloudless, except in the rainy season, and that the moon and the stars shine with unusual brightness in a clear blue sky.

During the Hamattan season, which begins about the middle of December and lasts to March, and is the driest and coolest part of the year, the wind blows from north-east. This wind takes the skin off, yet Monrad thinks this more healthy than the other seasons. The great rainy season begins in March and continues to the beginning of June. At first the rain pours down continually, and as the dry earth cannot absorb it quick enough, the whole country is covered with water. The rain however gradually diminishes; but during the whole season it is frequent and heavy. From June to the end of September is the warm season, which is the most unhealthy, especially the month of August, when the fogs are denser than at other times, and generate fevers. September however and October, which are the hottest months, are considered healthy. In October and November showers of rain are frequent, and hence this part of the year is called the little rainy season. Except during the Hamattan season, the winds blow from the west in the middle of the day, from eleven to three o'clock, but in the evening from south-west, and in the morning from north-west.

The climate is in general unhealthy, especially to Europeans on their arrival. Every person is attacked by a fever, which is called the seasoning, and many die of it; but when Europeans have become acclimatized, and adopt a regular manner of life, they may enjoy good health for many years. Monrad however observes, that he never saw a European who had attained the age of fifty.

This coast was formerly much resorted to by European and American vessels for slaves. When we consider that during more than a century nearly 100,000 persons were annually removed from this country as slaves, we must admit that the interior of this portion of Africa is much more populous than is commonly supposed. Many of the slaves however were brought from distant parts of the interior. At present a few vessels fetch gold and ivory: they give in exchange fire-arms, iron and iron ware, tobacco, rum, and some other articles. Many of the numerous factories and forts formerly erected on this coast for the protection of the slave-trade, have, since its abolition, been broken up and abandoned.

West of Cape Three Points the Dutch had three forts, and the English had one, Apollonia, which have all been abandoned, except the Dutch forts of Axim or S. Antony, which is the second best of the Dutch forts on this coast, and affords good landing. East of Cape Three Points is the English fort Dixcove, with a small cove under the guns of the fort, capable of sheltering a few small boats: it is the only place on the whole coast where craft can be repaired. East of it were five Dutch forts, Boutry or Boutrou, Tacorary, Succondee, Chama, and Comenda, all of which are now abandoned, as well as the English fort at Comenda.

Farther east is the Dutch fortress Elmina, or S. George della Mina, the oldest European establishment on the coast. It was erected in 1411, by the Portuguese, under the command of Don Diego d'Azambuja: the Dutch took it from the Portuguese in the beginning of the seventeenth century. It is the best fortified place on the coast, and is defended by the castle of S. Jago. The reefs along the coast form a harbour for small vessels, and the Dutch have built piers and wharfs for landing goods. The town is the only one on the coast built of stone, and the only one that is paved, but it is badly laid out, the houses being all built close together. The population is about 8000.

A few miles farther east is the principal English fortress, Cape Coast Castle, which covers a considerable space, and contains comfortable apartments for the officers, and good barracks for the privates. There are some spacious warehouses. It is built on a rock close to the sea. The town, which is behind the fortress, is considerable; but the houses are of mud, and huddled together.

East of Cape Coast Castle is the Dutch fortress of Mouree, which is now abandoned; and the next, which is the English fortress Annamabo, has a safe landing-place, and is surrounded by a town with 4000 inhabitants. The English forts Tantum and Winnebah are abandoned, and also the Dutch fortress of Berku. Near it is the English fortress of Accra, which is situated in a fine open plain several miles in length. The Dutch fortress of Crevecœur, near it, is abandoned.

East of Accra, but at no great distance from it, is the Danish fortress of Christiansburg, and farther east Friedensburg, which also belongs to the Danes. The smaller Danish forts, as Prinzerstein, have been abandoned. At a considerable distance from them, on the Slave Coast, is the last of these fortified settlements, the English fort of Whydah. In its neighbourhood the Portuguese had two small fortresses, but we do not know if they are still retained by them. The possessions of the Europeans are entirely limited to the fortresses, and their governors have no authority over the places near them, which are almost entirely inhabited by natives.

(Robertson's *Notes on Africa*; Hutton's *Voyage to Africa*; Adams's *Remarks on the Countries extending from Cape*

Palmas to the River Congo; Monrad's *Gemählde der Küste von Guinea.*)

COBALT. This metal is said to have been employed as early as 1540 for the purpose of giving a blue colour to glass. It was however first procured in a separate state by a Swedish chemist named Brandt, in 1733. Various processes have been recommended for obtaining this metal in a state of purity, which however is not a matter of importance for the various purposes to which it is applied. The following may perhaps answer the purpose as well as any on the small scale. Suppose the ore to contain cobalt, arsenic, copper, and nickel, dissolve it, after roasting to get rid of the greater part of the arsenic, in nitric acid; immerse a plate of iron, to precipitate the copper; then boil the solution with excess of soda, which will throw down the cobalt, nickel, and iron: dissolve this in muriatic acid, and add the solution to excess of ammonia, which will dissolve the oxides of nickel and cobalt; to the solution add potash, which will throw down the oxide of nickel, and after some days' exposure to the air, or more quickly by heat, the cobalt will be precipitated nearly or quite pure in the state of oxide. By heating it very strongly mixed with black flux it will be reduced to the metallic state. The properties of cobalt are, that it is of a reddish-grey colour, and weak metallic lustre. Its specific gravity is 7·834, according to Dr. Turner. It is not acted upon by exposure to air or water, but together they oxidize it. It fuses at a high temperature, probably rather below that of iron, and when cooling it crystallizes. It is stated that it obeys the magnet, but this is questionable.

Oxygen and Cobalt combine to form two distinctly-marked compounds; and a third, which, if not regarded as a compound of them, is a ¾ oxide. The protoxide of cobalt may be obtained by calcining the metal at a high temperature in the air, or by dissolving it in nitric acid.

Protoxide of Cobalt is obtained by dissolving the metal in nitric acid, and decomposing the solution, or that of any other salt of the metal, by carbonate of potash; the carbonate precipitated, after due washing, is to be dried, and then decomposed at a red heat without the access of air. This oxide is of an ash-grey colour; it is insoluble in water, but readily dissolved by acids, and by ammonia and its carbonate, forming with them a solution of a fine red colour. It is not soluble in the alkalis, potash or soda, or in their carbonates. When exposed to a red heat in the air, it gradually absorbs oxygen and becomes peroxide. It is the basis of all the salts of cobalt, and they usually have a red colour. It is composed of

1 equivalent of	cobalt	30
1 „	oxygen	8
	equivalent	38

When a solution of nitrate of cobalt is decomposed by potash, a blue hydrate is precipitated, which absorbs oxygen from the air, and becomes of a dirty green colour, and this is stated to be a hydrate of the ¾ oxide.

Peroxide of Cobalt.—When a solution of chloride of cobalt is mixed with one of hypochlorite (or chloride) of lime, a black precipitate is obtained, which consists of peroxide of cobalt combined with two equivalents of water; the water may be expelled at a heat of about 600°, but it is difficult to expel the whole of the water, without at the same time getting rid of some of the oxygen. It does not combine with any acids; and when treated with hydrochloric acid, chloride of cobalt is formed, and chlorine gas evolved. This oxide is applied to no use, and consists of

2 equivalents of	cobalt	60	or 1	30
3 „	oxygen	24	1½	12
	equivalent as peroxide	84	as sesquioxide	42

Oxide of Cobalt is procured when carbonate of cobalt is gently heated in an open fire. It is of a dark brown colour. The same oxide is obtained by heating the peroxide to redness, by which such a portion of its oxygen is expelled as reduces it to a compound of

3 equivalents of	cobalt	90
4 „	oxygen	32
		122

It suffers no change by continued heat, and is therefore the most stable oxide of cobalt.

Chlorine and Cobalt may be made to unite by direct action, but the best method of forming this salt is to dissolve the protoxide of the metal in hydrochloric acid, when water and the chloride are formed. By evaporation small pink-coloured crystals are obtained, which are a hydrate. By evaporation to dryness a white scaly chloride is obtained: it is volatile at about a red heat; but when air is present, it is decomposed, chlorine is expelled, and peroxide formed. The solution when concentrated is of a deep green colour, but by dilution with water it becomes of a pale pink; when a dilute red solution is heated so as to evaporate the water, a green chloride is left, which by exposure to the air attracts moisture and becomes again colourless. This has been called Hellot's sympathetic ink.

Chloride of cobalt consists of

1 equivalent of	cobalt	30
1 „	chlorine	36
	equivalent	66

The bromide, fluoride, and iodide of cobalt, are but little known, and are unimportant compounds.

Sulphur and Cobalt unite in three different proportions, forming the sulphuret, sesquisulphuret, and bisulphuret. The sulphuret may be obtained by heating to redness a mixture of oxide of cobalt and sulphur: light is disengaged during their combination, and the sulphuret which is formed fuses. It is of a yellowish-grey colour, crystalline, and has a metallic lustre. It may also be formed by passing a current of hydrosulphuric acid gas into a solution of a neutral salt of cobalt.

Sulphuret of cobalt is composed of

1 equivalent of	cobalt	30
1 „	sulphur	16
	equivalent	46

Sesquisulphuret of Cobalt.—When sesquioxide of cobalt is heated in hydrosulphuric acid gas, taking care not to carry the heat to redness, sesquisulphuret of cobalt of a deep grey colour is obtained. This compound also occurs in nature. It consists of

1 equivalent of	cobalt	30
1½ „	sulphur	24
	equivalent	54

Bisulphuret of Cobalt may be formed by heating the sesquioxide with three times its weight of sulphur to about the temperature at which sulphur is volatilized. When hydrochloric acid is added to the residue, it decomposes any protosulphuret which may have been formed; by a solution of potash any excess of sulphur may be dissolved, and pulverulent bisulphuret of cobalt of a black colour, but no metallic lustre, is left. Hydrochloric acid does not act upon it. It consists of

1 equivalent of	cobalt	30
2 „	sulphur	32
	equivalent	62

Phosphuret of Cobalt is obtained by adding phosphorus to the ignited metal, or by heating a mixture of superphosphate of lime, oxide of cobalt, and charcoal. It is very fusible, brittle, of a bluish-white colour, and tarnishes on exposure to the air. Its exact composition has not been determined.

Selenium and Cobalt combine very readily with the production of heat; when the mass is heated to redness, the excess of selenium is expelled, it liquefies, and yields a product of a metallic appearance, a grey colour, and laminated fracture.

Cobalt and the metals combine, or at least cobalt unites with several of them, but the resulting alloys are by no means important.

Arsenic and Cobalt combine with facility; and the compound occurs in some of the ores. The arseniuret of cobalt fuses at a high temperature into a white brittle mass. It occurs in nature.

Antimony and Cobalt form a brittle alloy.

Tin and Cobalt yield a bluish-white alloy, which is somewhat ductile.

Zinc and Cobalt combine, if at all, with so great difficulty, that some chemists have denied the possibility of it.

Bismuth and Cobalt do not combine.

Lead and Cobalt unite with difficulty. The alloys in general possess the characters of the predominating metal; they are all but slightly malleable, and are harder than lead.

Mercury and Cobalt do not amalgamate.

Silver and Cobalt do not combine, and when they are melted together they separate on cooling. Still however the silver retains a little cobalt, which renders it brittle, and the cobalt a little silver, which gives it a lighter colour.

Gold and Cobalt may be combined in several proportions. Gold, with $\frac{1}{4}$ of cobalt, gives a dull yellow alloy, which is not at all malleable, nor is it when it contains only $\frac{1}{20}$, but when it amounts to only $\frac{1}{100}$ the alloy may be forged.

Platinum and Cobalt form a fusible alloy.

Acids and Cobalt form various salts, of which the protoxide is always the base. As they are not very important compounds, we shall describe only a few of them.

Nitrate of Cobalt.—This salt is easily procured by dissolving either the metal or the protoxide in dilute nitric acid. The solution is of a red colour, and by evaporation yields crystals of a deep brownish-red colour, the form of which does not appear to have been ascertained. Their taste is bitter and acrid, and they redden litmus paper; they are deliquescent, very soluble in water, and dissolved also by alcohol. When moderately heated the crystals fuse, and part with their water of crystallization; afterwards, when the heat is increased, they become blue, but the red colour returns on cooling; if still more strongly heated, the nitric acid is decomposed, and peroxide of cobalt remains. This salt is composed of

1 equivalent of nitric acid	.	54
1 „ oxide of cobalt	.	38
6 „ water	.	54
Equivalent	.	146

Carbonate of Cobalt may be prepared by adding a solution of carbonate of potash to one of nitrate of cobalt, washing and drying the precipitate, which is the carbonate of cobalt. It is of a light pink colour, tasteless, unaltered by exposure to the air, and insoluble in water, but readily decomposed by acids. It consists of

1 equivalent of carbonic acid	.	22
1 „ oxide of cobalt	.	38
1 „ water	.	9
Equivalent	.	69

A sesquicarbonate may probably be formed.

Sulphates of Cobalt, of which there appear to be three, viz. the neutral sulphate, bisulphate, and subsulphate. The neutral sulphate is obtained by adding carbonate of cobalt to dilute sulphuric acid; the solution is of a red colour, and by evaporation yields rhombic prismatic crystals of sulphate of cobalt, which are of a deep red colour. This salt has a sharp, bitterish, metalline taste; it is soluble in twenty-four parts of cold water, but insoluble in alcohol. When moderately heated the crystals lose their water of crystallization, and become opaque without melting, and may be made red-hot without suffering decomposition. This salt is constituted of

1 equivalent of sulphuric acid	.	40
1 „ oxide of cobalt	.	38
6 „ water	.	54
Equivalent	.	132

The *Bisulphate of Cobalt* is prepared by adding acid to the neutral sulphate; the crystals are red four-sided prisms, which effloresce when exposed to the air; they contain twice as much acid and half as much water as the sulphate.

Subsulphate of Cobalt is formed when a quantity of soda or potash is added to the sulphate insufficient totally to decompose it. It is a flesh-red powder, insoluble in water; its exact composition does not appear to have been ascertained.

Phosphate of Cobalt is prepared by double decomposition. When phosphate of soda is added to sulphate of cobalt, a violet-coloured precipitate is formed, which becomes rose-coloured on drying in the air. It is insoluble in water, not decomposable by heat, but is so when charcoal is mixed with it. Its composition has not been accurately ascertained. It is used in making a pigment known by the name of Thenard's or Cobalt Blue.

The distinguishing characters of the salts of cobalt are, their red or brownish-red colour; they are not decomposed by hydrosulphuric acid, but the hydrosulphites throw down black sulphuret of cobalt; the caustic alkalis give a blue or green precipitate, ferrocyanide of potassium a greyish-green, and the alkaline carbonates a bright red. Cobalt is not precipitated by zinc.

Cobalt is very extensively employed. Its oxide gives an intense and beautiful blue colour to glass; and hence is used in colouring both glass and porcelain. Blue glass reduced to a fine powder is called *smalts* or powder blue, and is used for relieving the yellow tint of writing-paper and linen. Phosphate of cobalt has been already mentioned as entering into the composition of a blue pigment.

COBALT ORES. Cobalt is not found in the native state, and its ores, though not numerous, require a more minute examination than they have hitherto received. We shall notice those which are best known.

Bright White Cobalt or White Cobalt occurs crystalline and massive: the primary form is a cube, the planes of which are usually striated; colour silver-white; streak greyish-black; lustre metallic; hardness 5·5, yielding with difficulty to the knife, and not very frangible; specific gravity 6·3—6·5; fracture uneven; cleavage parallel to the faces of the cube; before the blowpipe on charcoal gives arsenical fumes: and tinges borax of a deep blue.

It is found in fine crystals at Tunaberg in Sweden, in Norway, Silesia, and Cornwall.

It is met with also amorphous, arborescent, botryoidal, and stalactitic.

Analysis of the crystals from Tunaberg by

		Klaproth.	Stromeyer.
Cobalt	.	44	36·7
Arsenic	.	55	49·0
Sulphur	.	00·5	5·6
			6·5
		99·5	97·8

Tin-White Cobalt or Hard White Cobalt occurs massive and crystallized in cubes and octohedrons: colour tin white, but sometimes externally tarnished; fracture fine-grained and uneven; lustre metallic; it yields with difficulty to the knife, and is hard and brittle; specific gravity variously stated, from 6·74 to 7·7; yields arsenical vapour when heated with the blowpipe, and tinges borax deep blue.

The massive is amorphous, arborescent, botryoidal, &c. The amorphous occurs in Cornwall, and the crystallized at Skutterud in Norway. Analysis of the crystals by Stromeyer:—

Cobalt	.	33·10
Arsenic	.	43·46
Iron	.	3·23
Sulphur	.	20·00
		99·79

Grey Cobalt occurs massive and crystallized; primary form a cube: colour greyish tin-white: streak greyish-black; lustre metallic; hardness 5·5; specific gravity 6·466; fracture uneven; cleavage indistinct.

The massive occurs amorphous and reticulated. It is found principally at Schneeberg in Saxony, and is used in the manufacture of smalt.

Earthy Cobalt occurs massive, amorphous, botryoidal, pulverulent, &c.; colour yellowish-brown and bluish-black; specific gravity 2—2·4; the fracture of the massive is earthy and dull, but polished by friction, and yields to the knife readily; when heated on charcoal gives an arsenical odour, and a deep blue colour with borax: it is found in Hesse, Saxony, Bohemia, and also in Cheshire and Cornwall.

Sulphuret of Cobalt occurs yellowish-white and steel-grey; streak grey; it is amorphous or botryoidal and externally brilliant; fracture uneven. According to Hisinger it consists of

Cobalt	.	43·2
Copper	.	14·4
Iron	.	3·53
Sulphur	.	38·50
Earthy matter	.	·33
		99·96

Arseniate of Cobalt—Cobalt Bloom—Red Cobalt—occurs fibrous, massive, and crystallized; primary form an ob-

lique rhombic prism; colour various shades of red passing into crimson; sometimes greyish; translucent, transparent; it is soft, light, and flexible; specific gravity 2·948; the massive variety amorphous, botryoidal: structure fibrous, radiating; below the blow-pipe emits arsenical odours, and tinges borax blue: it occurs in Saxony, Bohemia, Scotland, and Cornwall, &c.

Analysis by Bucholz:—

Arsenic acid	37·9
Oxide of cobalt	39·2
Water	22·9
	100

Sulphate of Cobalt—Red Vitriol—is of a pale rose-red colour, and occurs investing other minerals, in small masses and in stalactites; the masses are semi-transparent and crystalline; it is soluble in water; translucent; lustre vitreous, often dull externally: it occurs among the mining heaps near Hanau and in Salzburg.

COBB. [GULL.]

COBBETT, WILLIAM, was the son of a farmer and publican at Farnham, in Surrey, where he was born, it is supposed, in 1762. He has himself related the incidents of the first portion of his life in 'The Life and Adventures of Peter Porcupine,' first published in 1796. This tract contains a most interesting account of his self-education, carried on under circumstances of difficulty, and with an ardour and steadiness of purpose that have never been surpassed. He was trained up to country work, and so employed from an early age till the autumn of 1782, when, on a visit to the neighbourhood of Portsmouth, he first beheld the sea, and the next day made an unsuccessful attempt to get employment on board a man of war. In May, the following year, on the impulse of a sudden thought which took him at Guildford fair, he came to London, and soon, by the assistance of a friend, obtained a situation as copying clerk to Mr. Holland, of Gray's Inn. After remaining here nine months, he went to Chatham, where he enlisted in a regiment of foot, which was sent out to Nova Scotia, and was eventually ordered to New Brunswick. For his excellent conduct he was made a corporal before the regiment left England; and soon after its arrival in America he was raised at once, over the heads of thirty serjeants, to the rank of serjeant-major. In New Brunswick he made his acquaintance with his future wife, then a girl of thirteen, the daughter of a serjeant-major of artillery. His own account of his courtship and marriage is, it may be fairly said, one of the most beautiful moral pictures ever drawn. Cobbett's regiment did not get back to England till the end of the year 1791, when, at his earnest request, he obtained his discharge, with a testimonial from his commanding officer, declaring that he had served honestly and faithfully for the space of eight years, and was discharged 'in consideration of his good behaviour and the services he had rendered the regiment.' He now engaged in a proceeding, of his conduct in which and the motives by which he was actuated no intelligible explanation has ever been given; we mean his bringing charges of peculation against four officers of his late regiment, and then, when a court-martial was appointed to try them, and every arrangement connected with it made in the manner he himself required, declining to come forward to prosecute. When, on the day of trial, to the surprise of all concerned, he did not make his appearance, after forty-seven witnesses named by him had been brought up from Portsmouth to London, the court, in the notion that some accident might possibly have happened to him, adjourned to the third day after, and in the mean time search was made for him in all directions; but he had crossed over to France. He remained in that country for six months, and then sailed from Hâvre de Grace for New York, where he arrived in October, 1792. About two years after this date he made his first appearance as a public writer, in an attack upon Dr. Priestley, then newly arrived in the United States from England, under the title of 'Observations on the Emigration of a Martyr to the Cause of Liberty, by Peter Porcupine.' This pamphlet attracted much notice, and was followed by a long succession of others in the same violent anti-democratic strain, and with the same signature. The whole were afterwards collected and reprinted in England in 1801, in twelve volumes octavo. The outrageous recklessness and personality of his invective, however, at length exposed him to several prosecutions for libel; and the inconveniences in which he was thus involved induced him, in June, 1800, to quit America for England. On arriving in London, he immediately started a Tory daily paper, under the title of 'The Porcupine;' but it was discontinued after an existence of only a few months. Upon this he commenced his 'Weekly Register,' which rapidly attained a large circulation, and which he kept up without the failure of a single week from its first publication till his death, a period of above thirty-three years. In the course of this time, however, it wholly changed its politics, having eventually become the most determined among the assailants of the government and the champions of democracy. The first indications of this change appeared in the course of 1803; but it was not till some years later that the conductor of the Register had completely reversed his original position. In the year 1804 two verdicts had been given against him for libel; in consequence of the first of which (for libels on the Earl of Hardwicke, then lord lieutenant of Ireland, Lord Redesdale, lord chancellor of that country, and other persons connected with the Irish government) he was fined 500*l.*; and by the second of which he was cast in 500*l.* damages to Mr. (now Lord) Plunket, then the Irish solicitor-general. In 1810 he was again tried on an information at the instance of the government for certain observations in the Register of the 10th July, 1809, on the flogging of some local militia-men at Ely; and the result was a conviction, on which he was sentenced to pay a fine of 1000*l.* to the king and to be imprisoned for two years. When he came out of prison, he set in motion a new engine for the annoyance of the administration, in the series of papers which he called his 'Twopenny Trash,' the circulation of which is said at one time to have amounted to 100,000 copies. In April, 1817, however, professedly to escape from the operation of the Six Acts, but partly also, as it is believed, in consequence of certain pecuniary embarrassments, he again visited America. While there he still continued the publication of his Register in London, the manuscript being regularly transmitted across the Atlantic. He returned to England in 1819, and soon after commenced a daily paper, which lasted only two months, involving him in further losses. Other two actions for libel immediately followed, in both of which he was cast; the damages awarded in the first (brought by Mr. Cleary) being only 40*s.*, but in the second (brought by Mr. John Wright) 1000*l.* Amidst all these troubles, neither the regularity nor the spirit of his literary labours ever relaxed. His Register was only one of many productions which his untiring and ever vigorous pen was constantly giving to the world. In 1820 he made his first attempt to get into parliament, by standing a contest for the city of Coventry, in which he was defeated. In 1826 he was again unsuccessful in a similar attempt at Preston. In 1829 and 1830 he attracted much attention by a number of political lectures which he delivered in several of the principal towns of England and Scotland. In July, 1831, he was again tried on a prosecution for libel, the charge being grounded on an article which had appeared in the Register, and which was alleged to have been published with the intent of exciting the agricultural labourers to acts of violence and to destroy property. He defended himself on this occasion in a speech of six hours; and, the jury not being able to agree in a verdict, the trial ended in his discharge.

In 1832 Cobbett was returned to the first reformed parliament as one of the members for Oldham. In the course of his parliamentary career he made several effective speeches; but his success in this new field did not, on the whole, come up to expectation, and on more than one occasion he damaged himself by those strange blunders which here and there mark every portion of his history. His death took place unexpectedly, and after a very short illness, on Thursday, the 18th of June, 1835.

A complete catalogue of Cobbett's publications would occupy more space than we can afford. Among those not already mentioned that have attracted most attention, are his 'Year's Residence in America;' his 'Emigrant's Guide;' his 'Poor Man's Friend;' his 'Cottage Economy;' his 'Village Sermons;' his 'History of the Protestant Reformation in England and Ireland;' his 'Advice to Young Men and Women;' his 'Grammar of the French Language;' his 'English Grammar,' in a Series of Letters to his Son; and his 'Rural Rides;' reprinted from the 'Register.' He also translated from the French Marten's Treatise on the 'Law of Nations;' and is under-

stood to have been the projector and original conductor of the 'Parliamentary History,' which, for some years, bore his name.

On the subject of the intellectual character of this remarkable man, there is already a more general agreement of opinion than might have been expected, considering the vehement partisanship of the greater portion of what he has written. His mind was one of extraordinary native vigour, but apparently not well fitted by original endowment any more than by acquirement for speculations of the highest kind. Cobbett's power lay in wielding more effectively perhaps than they ever were wielded before, those weapons of controversy which tell upon what in the literal acceptation of the words may be called the common sense of mankind, that is, those feelings and capacities which nearly all men possess in contradistinction to those of a more refined and exquisite character which belong to a comparatively small number. To these higher feelings and powers he has nothing to say; they and all things that they delight in are uniformly treated by him with a scorn, real or affected, more frank and reckless certainly in its expression than they have met with from any other great writer. He cares for nothing but what is cared for by the multitude, and by the multitude, too, only of his own day, and, it may be even said, of his own country. Shakspeare, the British Museum, antiquity, posterity, America, France, Germany, are, one and all, either wholly indifferent to him, or the objects of his bitter contempt. But in his proper line he is matchless. When he has a subject that suits him, he handles it, not so much with the artificial skill of an accomplished writer, as with the perfect and inimitable natural art with which a dog picks a bone. There are many things that other men can do, which he cannot attempt; but this he can do as none but himself can or ever could do it.

COBBLE. [DIVER.]

COBI. [GOBI.]

COBITIS, a genus of fishes belonging to the Abdominal Malacopterygii and family Cyprinidæ. This genus includes the *loaches*, fishes generally of diminutive size, which may be distinguished by their having the head small; mouth but slightly cleft, without teeth, and furnished with barbules on the upper lip; body elongated, covered with small scales, and invested with a mucous secretion; ventral fins situated far back, dorsal fin placed above them; gill openings small; branchiostegous rays three in number.

The loach, which is common in most of our running waters, will afford a good illustration of this genus. It is about four inches in length, and of a dirty pale-yellow colour, mottled with brown; its upper lip is furnished with six barbules, one of which springs from each corner of the mouth, and the others are situated on the fore part.

Like fishes in general which have barbules, the loaches feed at the bottom of the water. The species above described spawns in March or early in April, and is very prolific.

The *spined loach* (*Cobitis tænia*, Linn.) is a far less common species than the above; its form is more compressed; the barbules are very short, and consequently less conspicuous: the principal character however consists in its having two spines, one before each eye. From this character and some other differences of minor importance, this fish, with several others having the same structure, have been separated from the true loaches, and now constitute the genus Botia of Mr. Gray.

The loaches are extremely restless during stormy weather, when they generally rise to the surface of the water, which from their restlessness is kept in constant agitation.

COBLENZ, an administrative circle or division in the province of the Lower Rhine, belonging to Prussia. It is divided by the Rhine into two unequal parts, the larger portion being on the south bank. It lies between 50° and 51° of N. lat. and 6° and 9° E. long.; it is bounded in part on the east by the grand duchy of Hesse and the duchy of Nassau, and on the south by Rhenish Bavaria, Oldenburg, and Hesse Homburg. Its area is about 2300 square miles, of which about 567,000 acres are arable land; 16,900 gardens; 123,000 meadow and pasture land; 17,300 vineyards, and 556,000 forests and woods. Coblenz contains 12 minor circles, 34 towns, 19 market-towns, 917 villages, and 463 hamlets. The population, including the military, was, in 1817, 359,294; in 1825, 399,235; and in 1831, 438,928. The number of Roman Catholics, in 1828, was 268,320; of Protestants 129,682 and Jews 6724. The surface of the country is generally hilly. The left bank of the Rhine, which is the most fertile, is traversed by a portion of the Eifel, and the Hundrachen, of which the highest summit is the Druidenstein, on the north bank of the Rhine, a basalt rock 1579 feet above the sea. The rivers of this circle are:—On the left bank of the Rhine, the Nahe, the Moselle, and the Nette; on the right, the Lahn, Sayn, and Wied. The breadth of the Rhine between Coblenz and Bingen is 1160 feet; between Coblenz and Neuwied 1230; and at Neuwied 1400. The average breadth of the Moselle, between Trarbach and Coblenz, is 595 feet.

The circle is well cultivated, and the landscape is agreeably diversified with deep valleys, fertile plains, vineyards, and naked rocks. The hills, along the banks of the Rhine and Moselle, are covered with vineyards, and the declivities with corn fields and meadows. The stock of cattle in 1831 was 12,590 horses; 169,753 horned cattle; 143,070 sheep; 11,478 goats, and 49,630 swine. The chief manufactures are woollen yarn, leather, iron and iron ware, potashes, earthenware, tobacco, mill-stones, &c.

The circle consists of 12 minor circles:—

Coblenz, cap. Coblenz, 14,724; St. Goar—Boppart, 3700; Kreuznach—Kreuznach, 7900; Simmern—Simmern, 2700; Zell—Zell, 1890; Kocheim—Kocheim, 2350; Mayen—Mayen, 3920; Adenau—No town; Ahrweiler—Ahrweiler, 2450; Neuwied—Neuwied, 5350; Altenkirchen—No town; Wetzlar—Wetzlar, 4500.

The seat of the provincial administration is at Coblenz. The ecclesiastical affairs of the Protestants are distributed among eleven superintendentships, under the provincial consistory at Coblenz; the Roman Catholics, among eleven deaconries, under the bishop of Treves.

COBLENZ, the capital of the circle of the same name, and of the whole province of the Lower Rhine, lies in a beautiful situation at the conflux of the Moselle and Rhine, whence the city obtained its antient name of Confluens, Confluentia, or Confluentes. After the conquest of Gaul by Cæsar, it came under the dominion of the Romans. Drusus erected, on the right bank of the Moselle, a castle called Confluens, which subsequently came into the possession of the Frankish monarchs. After the division of the monarchy among the sons of Lewis, in 843, Coblenz fell to the share of Lotharius, and was included in Lothringia, which province was alternately in the possession of the French and Germans till it was finally annexed to the Germanic empire by Henry I.

In 1018 the Emperor Henry II. gave this city, with its many privileges, to the archbishop of Treves; since which period Coblenz has remained attached to that archbishopric, though no longer among its temporalities. It was the occasional residence of many of the German emperors, and it was here that Conrad of Hohenstaufen was elected emperor in 1150. Here also (1338) Edward III. of England, when he laid claim to the throne of France and sought the assistance of Germany, met the Emperor Louis with other princes and several archbishops.

Coblenz was antiently fortified with walls and ramparts, traces of which still exist, and this part retained, for many centuries after it had been considerably extended, the name of Old Town. Coblenz is very irregularly built, with narrow streets and old houses. In what is still denominated 'the Old Court' stood the Roman castle, which became subsequently the palace of the Frankish monarchs, the German emperors, and the Archbishops of Treves. The 'Clement,' or New Town, which is very handsome, was built by the last electoral prince, Clement Wenceslaus of Metternich. Coblenz contains at present four Roman Catholic and two Protestant churches, and one synagogue: among the former the principal is the collegiate church of Saint Castor, built in 836, which was the place of meeting of the Council of 860, when three kings were present. The collegiate church of St. Florian, said to have been founded by the Empress Helena, has been fitted up for Protestant worship. The antient residence of the electoral princes is now the palace of justice; its chapel is built in a style of noble simplicity and adorned with paintings. There is a theatre. The castle yard is planted with trees and decorated with a pyramid 60 feet in height; the castle in the New Town has, since the French revolution, been converted into an hospital and magazines, &c. There are two bridges: one of stone, over the Moselle, 480 paces long, consisting of 14 arches, which was commenced in 1344 by Archbishop Baldwin; the other of wood, built in 1819 across the Rhine to the

valley of Ehrenbreitstein, is 485 feet in length, and rests on 38 pontoons. The old Jesuits' College, now the Gymnasium, has 300 scholars, besides 200 in the elementary school attached to it; it has a considerable revenue, and a fine library formed out of the remains of the monastic libraries. There are various schools for children, a Catholic seminary for schoolmasters, a musical institution, house of industry, ladies' benevolent association, savings' bank, an orphan asylum, and various other charitable institutions. Besides the valuable town library, there are many private collections of paintings, coins, and antiquities.

Coblenz is the head-quarters of the 8th corps of the army, the residence of the superior president (ober-president) or lieutenant-governor of the province, and the seat of the provincial administration. It has a linen and a cotton manufactory and an extensive one of Japan wares; besides manufactories of furniture, carriages, and other articles. There is scarcely any wholesale business carried on, and its trade is confined to exporting the productions of the neighbouring provinces, the importation of articles of home consumption, and the transport of goods along the Rhine and Moselle. Many of the inhabitants are engaged in the cultivation of the vine.

In connection with Ehrenbreitstein, Coblenz is strongly fortified, and an important military post. The population in 1817 was, including the military, 12,238; in 1822, 13,689; in 1825, 14,333; in 1828, 14,724 (of whom 13,888 were Catholics, 576 Protestants, and 260 Jews); and, in 1831, exclusive of the military, 12,214. 50° 21′ N. lat. and 7° 30′ E. long.

COBRA CAPELLO. [ASP. VIPERIDÆ.]

COBURG, the most southern of the independent principalities of Saxony, is bounded by the territories of Schwarzburg, Meiningen, Hildburghausen, and Bavaria; it lies between 50° 9′ and 50° 24′ N. lat., and 10° 30′ and 11° 13′ E. long., including the newly acquired territories of Königsberg and Sonnenfeld: its area is about 200 square miles, about one-fourth more than the area of Rutlandshire. It is composed of the great valley of the Itz, which is bordered on the north by the Thuringian mountains, and is traversed by the rivers Itz, Rodach, Steinach, Nasslach, Lauter, and others. Besides Coburg, properly so called, the principality now comprehends the whole of the duchy of Gotha, and the principality of Lichtenberg, which lies on the left bank of the Rhine: the whole constitutes the duchy of Saxe-Coburg-Gotha. 'Coburg Proper' belonged formerly to the counts of Henneberg; it came by marriage to the house of Saxony, whence it passed into the Ernestine line, and in 1735 to the branch of Saalfeld. The principality of Lichtenberg was added to it in 1816, and the duchy of Gotha (with the exception of some small districts) in 1826, in consequence of that house having become extinct by the death of Duke Frederic IV., when it was made over to the house of Saxe-Coburg-Saalfeld, by virtue of a family compact among the ducal-Saxon branches, in exchange for the duchy of Saalfeld and several other districts. Thus arose the present duchy of Saxe-Coburg-Gotha, containing altogether about 1000 square miles, nearly as large as Dorsetshire, and 153,700 inhabitants, which shows an increase of upwards of 8000 since the year 1826, when their numbers were 145,893; it has eleven towns, ten market-towns, 253 villages and hamlets, and about 28,100 houses.

Coburg Proper contains 32,000 inhabitants; and, including the lately acquired districts of Königsberg and Sonnenfeld, 38,000, of whom the majority are Lutherans: the Catholics (about 11,000) enjoy the free exercise of their religion. By the constitution of the 8th of August, 1821, the right of citizenship is enjoyed by natives only, who are all equal in the eye of the law, without regard to their religious profession. The legislative body consists of a single chamber, composed of six deputies from the nobility, and eleven from the magistracy, towns, and rural districts.

The climate is mild, especially in the fruitful valley of the Itz. The agricultural products are timber and fuel, grain, particularly peas, beans, hops, vegetables, &c. Iron, copper, cobalt, coals (but none of them in large quantities), limestone, sandstone, marble, alabaster, gypsum, porcelain earth, &c. are found here. The inhabitants are chiefly occupied in the manufacture of linen, woollens, and cotton, wooden toys, and the rearing of cattle. The principal articles of export are fatted cattle and grain; besides butter, leather, wood, wool, linen, and other manufactured goods. The duke takes the fifth rank among the Saxon dukes, and with them has the twelfth place at the diet, and a separate voice at the Plenum, or in the full assemblies of the diet.

Besides Coburg, the principality contains Rodach, a town on the river of the same name, with a ducal mansion, a church, 300 houses, and about 1430 inhabitants; Sonnenfeld, a market-town of about 600 inhabitants; Königsberg, upon a hill, and on the Nasslach, with a grammar-school, and about 750 inhabitants; and Neustadt, at the foot of Mount Mupp, with about 230 houses and 1400 inhabitants, having a tobacco-manufactory, hop-grounds, and some trade. [SAXE-COBURG-GOTHA.]

COBURG, a bailiwick (Amt), in the principality of the same name, situated on both banks of the Itz. Exclusive of the precinct of Coburg the capital, it occupies about 66 square miles, has one market-town, 69 villages and hamlets, 1688 houses, and about 9700 inhabitants.

COBURG, the capital of the principality of the same name, in a picturesque valley on the banks of the Itz, is surrounded by walls, and, with its long suburbs, is divided into nine quarters, which have two market-places, 36 streets, 752 houses, and about 9060 inhabitants. It is far from being a handsome town; the houses are small, the streets rough, and in many places overgrown with grass. The ducal palace of Ehrenburg (burg of honour), which name it received from Charles V., has been made into a very elegant residence by the reigning duke, and has a library of 26,000 volumes, and a collection of natural history, minerals, coins, and prints. There are also the government buildings, in the Italian style of architecture; the town hall; five churches, of which Saint Maurice's church contains the ducal vault and some good monuments; the arsenal, orphan asylum, three hospitals, &c. The gymnasium, founded in 1605, by Duke John Casimir, hence called Casimirianum, has all the rights and privileges of a university. There are besides two public libraries, a collection of natural history, an observatory, with a normal school (pädagogium) attached to it; various schools, a Sunday school for mechanics and apprentices, which, in 1823, was attended by 25 mechanics and 175 apprentices; a technological society; a society of the arts and sciences, &c. There are likewise two infirmaries, a savings' bank, a ladies' benevolent association, and other charitable institutions.

The inhabitants carry on manufactures of woollens, cottons, linen, furniture, buckles, dyeing, especially the real Turkey red; gold and silver articles, chocolate, salammoniac, tools, &c. They have also a considerable trade in wool, cloth, cottons, horse-hair, flour, seeds, &c. There are several pleasure-grounds round the town, as well as many delightful rides and walks—among other places, to the ducal country seat, Rosenau, which was an old baronial castle, and has been restored in the Gothic style. Near the town are marble-polishing mills, and iron and copper works. On a lofty hill in the vicinity, which commands a beautiful prospect, is the antient fortress of Coburg, surrounded with a strong wall and five bastions. It contains many interesting remains of antiquity, arms, armour, &c. It was for some time the residence of Luther, where he delivered many of his discourses; it now contains a well-conducted house of correction, the inmates of which are employed in grinding spectacles. There are also, in the neighbourhood of Coburg, the picturesque ruins of the castles of Callenberg and Lauterberg. 50° 15′ N. lat., 10° 50′ E. long.

COCA, the dried leaf of Erythroxylon Coca, is one of those stimulating narcotics which belong to the same class with tobacco and opium, but is more remarkable than either of them in its effects upon the human system. The plant is found wild in Peru, according to Pöppig, in the environs of Cuchero, and on the stony summit of Cerro de San Cristobal. It is cultivated extensively in the mild but very moist climate of the Andes of Peru, at from 2000 to 5000 feet above the sea: in colder situations it is apt to be killed, and in warmer districts the leaf loses its flavour.

A detailed account of it is given by Pöppig and Sir William Hooker in the 'Companion to the Botanical Magazine,' whence we extract the following information. It forms a shrub from four to eight feet high, the stem covered with whitish tubercles, which appear to be formed of two curved lines set face to face. The leaves are oblong, acute at each end, three-ribbed, on short petioles, with a pair of intrapetiolary brown acute stipules. Flowers in little fascicles; peduncles sharply angled; calyx five-cleft; petals oblong,

concave, wavy, with a jagged plaited memorane arising from within their base; stamens ten; styles three; fruit a one-seeded oblong drupe.



[Erythroxylon Coca.]

The effects of this drug are said to be of the most pernicious nature, exceeding even opium in the destruction of mental and bodily powers. The coca leaf is chewed by the Peruvian, mixed with finely-powdered chalk, and brings on a state of apathy and indifference to all surrounding objects, the desire for which increases so much with indulgence in it, that a confirmed coca-chewer is said never to have been reclaimed. Pöppig describes such a person in his usual graphic manner:—

'Useless for every active pursuit in life, and the slave of his passions, even more than the drunkard, he exposes himself to the greatest dangers for the sake of gratifying this propensity. As the stimulus of the coca is most fully developed when the body is exhausted with toil, or the mind with conversation, the poor victim then hastens to some retreat in a gloomy native wood, and flinging himself under a tree, remains stretched out there, heedless of night or of storms, unprotected by covering or by fire, unconscious of the floods of rain and of the tremendous winds which sweep the forest; and after yielding himself, for two or three entire days, to the occupation of chewing coca, returns home to his abode, with trembling limbs and a pallid countenance, the miserable spectacle of unnatural enjoyment. Whoever accidentally meets the *coquero* under such circumstances, and by speaking interrupts the effect of this intoxication, is sure to draw upon himself the hatred of the half-maddened creature. The man who is once seized with the passion for this practice, if placed in circumstances which favour its indulgence, is a ruined being. Many instances are related to us in Peru, where young people of the best families, by occasional visiting of the forests, have begun using the coca for the sake of passing the time away, and, acquiring a relish for it, have, from that period, been lost to civilization; as if seized by some malevolent instinct, they refuse to return to their homes; and, resisting the entreaties of their friends, who occasionally discover the haunts of these unhappy fugitives, either retire to some more distant solitude, or take the first opportunity of escaping when they have been brought back to the towns.'

The immoderate addiction of the Peruvians to the use of this drug is such that their forests have long since ceased to be able to supply their wants, and the cultivation of the plant has been carried to a very great extent, not only under the Incas, but beneath the local government of the Spaniards, who seem to have been no more able to resist the temptation of a large revenue from the monopoly of this article than European nations from the consumption of ardent spirits. It is said that in the year 1583 the government of Potosi derived a sum of not less than 500,000 pesos duros from the consumption of 90 to 100,000 baskets of the leaf. The cultivation of coca is therefore an important feature in Peruvian husbandry, and, it is added, so lucrative that a coca plantation, whose original cost and current expenses amounted to 2500 pesos duros during the first twenty months, will, at the end of ten months more, bring a clear income of 1700 pesos duros. Pöppig states that coca has now become a sort of necessary evil; that thousands of persons would be deprived of their means of existence if its consumption were put a stop to; and that the value of it in Peru and Bolivia amounts to above 2½ millions of pesos duros a year.

The exciting principle of the coca has not yet been inquired into. It is stated by Pöppig to be of so very volatile a nature that leaves only 12 months old become perfectly inert and good for nothing. 'Large heaps of the freshly-dried leaves, particularly while the warm rays of the sun are upon them, diffuse a very strong smell, resembling that of hay in which there is a quantity of *melilot*. The natives never permit strangers to sleep near them, as they would suffer violent head-aches in consequence. When kept in small portions, and after a few months, the coca loses its scent and becomes weak in proportion. The novice thinks that the grassy smell and fresh hue are as perceptible in the old state as when new, and this is to be expected with the Peruvian, who never uses it without the addition of burnt lime. Without this, which always excoriates the mouth of a stranger, the natives declare that *coca* has not *its true taste*, a flavour, by the bye, which can only be detected after a long use of it. It then tinges green the carefully-swallowed spittle, and yields an infusion of the same colour. Of the latter alone I made trial, and found that it had a flat grass-like taste, but I experienced the full power of its stimulating principles. When taken in the evening it was followed by great restlessness, loss of sleep, and generally uncomfortable sensations; while, from its exhibition in the morning, a similar effect, though to a slight degree, arose, accompanied with loss of appetite. The English physician, Dr. Archibald Smith, who has a sugar plantation near Huanuco, once, when unprovided with Chinese tea, made a trial of the coca as a substitute for it, but experienced such distressing sensations of nervous excitement that he never ventured to use it again. The Peruvian increases its effects by large doses, utter retirement, and the addition of other stimulating substances. The inordinate use of the coca speedily occasions bodily disease, and detriment to the moral powers; but still the custom may be persevered in for many years, especially if frequently intermitted, and a *coquero* sometimes attains the age of fifty, with comparatively few complaints. But the oftener the orgies are celebrated, especially in a warm and moist climate, the sooner are their destructive effects made evident. For this reason the natives of the cold and dry districts of the Andes are more addicted to the consumption of coca than those of the close forests, where, undoubtedly, other stimulants do but take its place. Weakness in the digestive organs, which, like most incurable complaints, increases continually in a greater or less degree, first attacks the unfortunate *coquero*. This complaint, which is called *opilacion*, may be trifling at the beginning, but soon attains an alarming height. Then come bilious obstructions, attended with all those thousand painful symptoms which are so much aggravated by a tropical climate. Jaundice and derangement of the nervous system follow, along with pains in the head, and such a prostration of strength that the patient speedily loses all appetite; the hue of the whites assumes a leaden colour, and a total inability to sleep ensues, which aggravates the mental depression of the unhappy individual who, spite of all his ills, cannot relinquish the use of the herb to which he owes his sufferings, but craves brandy in addition. The appetite becomes quite irregular, sometimes failing altogether, and sometimes assuming quite a wolfish voracity, especially for animal food. Thus do years of misery drag on, succeeded at length by a painful death.' (Pöppig, *Reise in Chile, &c.*, vol. ii.; Hooker, *Compan. to Bot. Mag.* i. and ii.)

COCCINE'LLA. [TRIMERA.]

COCCOTHRAUSTES. [GROSBEAK.]

CO'CCULUS, a genus of Menispermaceous plants, consisting of climbers, whose leaves are usually more or less heartshaped, and the flowers small, and either white or pale green, in loose panicles or racemes; in most cases they are diœcious, and are always very minute. The most recent character of the genus is given by Messrs. Wight and Arnott, from whom it appears that the essential distinctions are, six sepals in two whorls, a corolla of six

petals, three or six distinct stamens, terminal two-celled anthers opening vertically; three, six, or more ovaries; and one-celled one-seeded drupes. The species are usually powerful bitter febrifuges. Cocculus crispus, a twining plant found in Sumatra and the Moluccas, with a tubercled or warted stem, is employed by the Malays for the cure of intermittent fevers. Owing to its intense bitterness and twining habit it was called *Funis felleus* by Rumf. Another plant, the Menispermum fenestratum of Roxburgh, is in great repute among the Cingalese, who slice it, steep it in water, and swallow it along with the infusion as a stomachic.

Cocculus villosus, a plant common in the hedges of Bengal, with variable downy leaves and axillary solitary female flowers, succeeded by deep purple berries the size of peas, is a species of considerable importance to the Hindoos. The juice of its ripe berries makes a good durable bluish-purple ink, according to Roxburgh, who adds some further particulars concerning its uses. 'A decoction of the fresh roots, with a few heads of long pepper, in goats' milk, is administered for rheumatic and old venereal pains; it is reckoned heating, laxative, and sudorific. The fresh leaves taste simply herbaceous; rubbed in water they thicken it into a green jelly, which is sweetened with sugar, and drank when fresh made to the quantity of half a pint twice a day, for the cure of heat of urine in gonorrhœa. If suffered to stand for a few minutes, the gelatinous or mucilaginous parts separate, contract, and float in the centre, leaving the water clear, like Madeira wine, and almost tasteless. Curry is made of the leaves, for people under a course of its roots, or jelly of the leaves.'

The species most important to Europeans is that which produces the celebrated Calumbo root, *Cocculus palmatus*, from which a valuable bitter is procured. This plant is a native of Mozambique and Oibo, abounding in the thick forests that cover the shores of those countries, and extending inland for fifteen or twenty miles. The Africans of those parts call it *Kalumb*. It has a large fleshy deep-yellow root, divided into many irregular forks or fangs, which are amputated by the collectors, cut into slices, strung on cords, and hung to dry in the shade. The stem is covered with a thick whitish-green glandular fur: the leaves are large, roundish, heartshaped, and deeply divided into from five to seven sharp-pointed lobes. The plant is now cultivated in the Isle of France.



[Cocculus palmatus.]
male flower; *b*, under side, showing calyx; *c*, stamen; *d*, petal; *e*, bracteæ.

The name given to this genus is that of a kind of seed imported from the East Indies under the name of *Cocculus Indicus*, possessing a powerful, bitter, poisonous principle, which, according to Goupil, exists principally in the kernel. It is found in the forests of Malabar, and when transplanted to the botanic garden, Calcutta, grew in a few years so as to extend over a large mango-tree, with a stout woody stem as thick as a man's wrist, covered with deeply cracked, spongy, ash-coloured bark. The leaves were very exactly cordate, entire, obtuse, or emarginate, of a hard texture, shining on the upper surface, and from 4 to 12 inches long, by from 3 to 8 inches broad. This plant is the *Menispermum cocculus* of Linnæus, the *Cocculus suberosus* of De Candolle; but according to Messrs. Wight and Arnott, it does not properly belong to the latter genus, having the stamens combined into a central column and no corolla. They call it *Anamirta cocculus*.

Cocculus Indicus berries are the fruit of the Cocculus suberosus (Decand.), the Menispermum Cocculus (Linn.) 'The medical jurist,' says Dr. Christison, 'should make himself well acquainted with its external characters, because, besides being occasionally used in medicine, it is a familiar poison for destroying fish, and has also been extensively used by brewers as a substitute for hops—an adulteration which is prohibited in Britain by severe statutes.' This fruit is a berried drupe, varying in size from that of a pea to that of a laurel (or bay) berry; subglobose, emarginate, dark-brown, opaque, rough, and wrinkled; the external integument, or husk, is very brittle; within is the seed or kernel, lunulate, oily, with a nauseous and intensely bitter taste. The kernel contains about one part in the hundred of picrotoxia, or menispermia, as some term it. Upon this principle its poisonous properties depend. It seems to act by exhausting the irritability of the heart, and if the dose be considerable, its fatal effects are very speedily displayed. What renders it a more redoubtable agent, is the circumstance of its leaving scarcely any trace of its presence on the coats of the stomach. Cocculus Indicus is never used internally in the practice of medicine, but an ointment formed of the powdered berries is very efficacious in some cutaneous diseases, such as Porrigo capitis, and Sycosis menti. It speedily allays the inflammatory state; but its employment requires great care. Creasote will probably supersede it in such cases.

Calumba is the root of the Cocculus palmatus, a native of the forests on the east coast of Africa, whence it is sent to Ceylon, and thence to Europe. It occurs in the form of transverse sections, the bark of which is thick and easily separable; the woody portion is spongy, of a yellow colour, and when old much perforated by worms. The odour is faintly aromatic, the taste bitter and slightly acrid. It contains much starch, a yellow azotized matter, a yellow bitter principle, traces of a volatile oil, woody fibre, salts (chiefly of lime and potassa), oxide of iron, and silex. The active principle is Calumbine, which may be obtained either by alcohol or æther. As Calumba contains nothing which can decompose the salts of iron, it may be given along with them. The powder is a good form: the infusion soon spoils, but is otherwise a very excellent form; a tincture or extract retains the virtues and keeps a long time.

Other roots are often fraudulently substituted for Calumba. Some of these are supplied by America, others by Africa. The American, which is the most common in England and the north of Europe, is the root of the Frazera Waltera (Mich.), a native of the marshes of Carolina. It may be distinguished from the true by its whiter colour, lighter texture, the presence of longitudinal pieces, and the taste being at first sweetish, and not nearly so bitter as genuine Calumba. Chemical tests further assist in discriminating them: solution of proto-sulphate or of permuriate of iron, does not trouble the tincture of the real, while it gives the false a dark green colour: the tincture of the genuine yields with tincture of galls a copious dirty grey precipitate, but the false none. The substance of the true is rendered blue by iodine, the false brown. In large doses the spurious causes vomiting, but the genuine allays that action.

Slices of bryony root are often employed to adulterate Calumba root.

Calumba acts chiefly upon the mucous membrane of the stomach, and upon the secretion and quality of the bile. It is not however without power over the nervous system, as

its efficacy in allaying the vomiting of pregnancy testifies. In diarrhœa, after proper evacuants, and in bilious vomiting, it is superior to all other medicines. The vomiting and nausea of the early months of pregnancy are much alleviated by it: while the want of appetite, accompanied with general debility, of feeble children, is often removed by Calumba along with preparations of iron.

Dr. Percival states that infusion of Calumba will remove the disagreeable odour of putrefying ox-gall.

CO'CCUS. [GALLINSECTA.]

COCCUS CACTO. [COCHINEAL.]

COCCYZUS. [CUCULIDÆ.]

COCHABAMBA. [BOLIVIA.]

COCHIN-CHINA is in that part of Eastern Asia which commonly goes by the name of India without the Ganges, of which it forms the eastern portion. It extends from 8° 40′ to about 23° N. lat., and from 102° to 109° 20′ E. long. Its length from north to south is about 980 miles, but in width it varies from 100 to 300 miles. Crawfurd assigns to it an area of only 98,000 square miles; but Berghaus makes its surface one third larger, or about 147,000 square miles. This country, therefore, is about 33,000 square miles more than the British islands.

On the west it borders on the kingdom of Siam, or Shan; on the north-west on the unknown regions of Laos, or Laetho; and on the north on the Chinese provinces of Yunnan, Quang-si, and Quang-tong (Canton). To the east of it extends the sea, called by the Chinese Nan-Hay, or the Southern Sea, which here forms an extensive gulf between the northern province of Cochin-China and the island of Hai-nan, called the Gulf of Ton-kin. To the south of Cochin-China extends the southern part of the China Sea.

The character of the most northern part of the coast is not known: in our charts a great number of islands and cliffs are laid down. At 21° N. lat., or near the mouth of the river Song-ca, and farther to the south, the shores are low, and partly sandy and swampy. Between 20° and 18° N. lat., opposite the island of Hai-nan, there is said to be a number of lagunes near the low shore, connected with one another, so as to form an inland navigation of great extent. These lagunes are not inserted in our maps. Near 17° N. lat. the shores begin to be high, forming capes several hundred feet in elevation, between which large bays run deep into the land. This is the general character of the coast between 17° N. lat. and Cape James (10° 17′ N. lat.) This coast is lined with a great number of small rocky islands and cliffs, but it contains numerous safe and excellent harbours. The remainder of the coast from Cape James to the very boundary of Siam is low and mostly swampy, being formed by the alluvial deposits of the river Maekhaun, or Camboja.

Cape James is the southern extremity of an extensive mountain range, which as far as the parallel of Cape Padaran (11° 20′ N. lat.) runs north-east, and then turns to the north, in which direction it continues to 14° N. lat., whence it continues with a north-north-western course to 16° N. lat. Farther north the range is little known, and it is conjectured that it joins the high mountains in the Chinese province of Yunnan. This range occupies perhaps a hundred miles in width, and seems to consist of a number of parallel ridges. Its height, which is not ascertained, appears to be considerable. A road leads over it between the towns of Sai-gun and Phu-yen, which is described as very difficult and dangerous.

Several short offsets which branch off towards the sea cover the greatest part of the maritime districts between 10° 20′ and 17° N. lat.; some of them are known to attain the height of 4000 feet above the sea. The most remarkable of these lateral ranges is that which forms the boundary between Cochin-China and Ton-kin, in about 17° 30′. It contains a depression, forming a mountain pass, about six miles in width, which is shut in by a wall, traversed by an artificial road, which leads from Hué to Kecho, and is so well made that it is said not to be inferior to any road in Europe; the length of this artificial road is estimated at 400 or 500 miles.

The boundary between Cochin-China and the Chinese province of Quang-si is partly formed by the river Ngannan-kiang, and partly by a mountain range, which seems to be a lateral range of the Yu-ling, a mountain system of southern China. Over this range there is a pass, which constitutes the boundary line of both countries, and is also shut in by a wall, on each side of which a military post is maintained by each country.

The northern part of Cochin-China, which formerly constituted the separate kingdom of Ton-kin, comprehends an extensive plain, surrounded, except where it borders on the gulf of Ton-kin (between 19° 30′ and 21° N. lat.), by mountains, which increase in height as they recede from the sea. This plain appears to extend above 100 miles in length and width. Being very low, a great portion of it is annually inundated by the river Song-ca, which fertilizes the soil, so that two or three crops of rice are annually cut. It is by far the most fertile and populous part of the country. The valleys which run up far into the mountains are equally fertile: the greatest part of them may easily be irrigated, and the mountains themselves are rich in metals. The Song-ca, or Sang-coy, the principal river of this country, rises in the mountain-region of Yunnan in China, in two branches; the Ho-ti-kiang and Li-sien-kiang, which run nearly parallel in a south-eastern direction, till they enter Cochin-China, where they unite, and take the name of Song-ca (Great River). Before this river enters the sea it divides into numerous branches, two of which are navigable. The northern arm, which formerly was visited by large European vessels, is said now to afford access only to vessels of 200 tons burden. The southern arm is navigated by Chinese junks.

The country east of the mountain-range, between 19° 30 and 15° N. lat., consists of an alternation of small plains and intervening mountain ridges. The plains often extend nine or ten miles in width, and terminate in the west with valleys. The mountains, which do not seem to rise to a great height, are in some places bare, and in others covered with forests. In many places cultivation extends to a considerable height on their sides. Most of the plains are irrigated and well cultivated. The rivers which traverse them have a short course, but supply abundance of water for irrigation, and most of them are navigable for some miles. In some places the plains are traversed by canals.

The country which extends from Cape Avarella to the neighbourhood of Cape James may be considered as entirely covered with mountains. The rocky masses approach so close to the sea as to leave a level tract along the beach only in a few places. In its numerous indentations a few narrow valleys of small extent occasionally appear, mostly inhabited by fishermen. But though this country (formerly called Chiampa) is unfit to maintain any great population along the coast, the interior is said to contain much cultivated ground, and to be pretty well peopled.

That portion of Cochin-China which lies to the west of the mountain-range constituted till lately the principal part of the independent kingdom of Camboja. [CAMBODIA.] The southern portion, which is imperfectly known, consists, except near the boundary of Siam, of an immense plain, which appears to be formed of the alluvium of the great river by which it is traversed. The shores and the adjacent country, as far as the tide ascends, which renders the water of the river salt, are covered with trees and bushes. About thirty miles from the sea the ground begins to be cultivated, and is exceedingly fertile. In the interior a great number of fresh-water lakes and swamps are said to cover a considerable part of the plain.

Two large rivers traverse this plain. The Sai-gon or Saung, which runs through its eastern portion, has been navigated by European vessels as far up as the town of Sai-gon, but farther northward its course is not known. Its course is said to be more than a thousand miles. Towards its mouth it sends off two or more branches, which join the eastern arm of the great river of Camboja, or the Maekhaun.

The great river of Camboja, called by the Burmens Maekhaun, is probably that which in the Chinese province of Yun-nan is called Lan-thsang, and rises on the high table-land of Eastern Asia, at no great distance from the upper course of the Yang-tse-kiang. In the province of Yun-nan this river is navigable: but where it descends from that table-land and leaves the territories of China, it breaks through an extensive mountain-region, in which its course, lying between high and steep mountains, is frequently interrupted by rocky ledges and cataracts. Where its valley begins to grow wider, it is said to send off a branch to the right, which joins the Menam, or river of Siam, between 18° and 19° N. lat. Its course farther south is unknown, but it is said to send off various lateral branches, which fertilize the country through which they flow, and

then re-unite with the river. About 150 miles from its mouth is the antient capital of Camboja, Pontaipret, to which European vessels ascended in the seventeenth century, but this navigation has been discontinued. Some distance below this town the river sends off to the west and south-west numerous arms, which enclose and traverse an extensive delta, that stretches out into the sea with an acute angle. Most of these arms are navigable for large river-barges during the rainy season. To make the navigation continuous through the whole year, a canal was made from it in 1820, which joins the principal river some miles south of Panompeng, the modern capital of Camboja. The three principal mouths of the Maekhaun lie on the eastern side of the delta, and are all navigable for vessels of considerable burden up to the capital of the country.

The climate of the plain of Camboja resembles that of Bengal. The rainy seasons last from the end of May or the beginning of June to September. In August the thermometer was at six o'clock in the morning 79°, at noon 82°, and at six o'clock in the evening 80°. The climate of the countries east of the mountains is similar to that of Coromandel. The mountains interrupt the clouds brought by the south-west monsoon, and accordingly the dry season prevails in that period: the north-east monsoon brings rain. The wet season sets in at the end of October, and continues until March. In the greatest summer-heat the thermometer never rises above 103°; in the greatest cold it never falls below 57°. In the countries on the shores of the Bay of Tonkin, the south-west monsoon brings the rain, and the wet season begins in May and terminates in August. The heat is occasionally very excessive, and the cold in December, January, and February, very sharp: the weather is often rendered unpleasant by heavy fogs, as in Lower Bengal. Typhons and hurricanes rage with the utmost fury in the Gulf of Tonkin and on the adjacent coasts; more southward, especially below 16° N. lat., they are rarely felt; and west of Cape James the sea and land are entirely exempt from them. They are commonly accompanied with heavy and incessant rains; and Crawfurd mentions that after a continued rain of forty-eight hours, the sea in the bay of Touron was covered with a stratum of fresh water, so that the casks of the vessels were filled with water good enough for the cattle and poultry. All the country seems to have a very healthy climate, for Europeans as well as for natives.

The iron mines of Tonkin are about six days' journey from Cachao, and the gold and silver mines about twelve days' journey, both in a western direction. The annual produce of the silver mines of Tonkin is estimated at about 213,600 ounces; that of the gold mines is unknown. All these mines are worked by Chinese: the number of miners is stated to be between 20,000 and 30,000. Cochin-China is said to have tin, which however is not worked.

Rice, which is the principal article of food, is very extensively cultivated in the plains of Tonkin and Camboja. Indian corn, earth nuts (*Arachis hypogæa*), and the *Convolvulus batatas*, are also cultivated. The sugar-cane is extensively cultivated on the coast, south of 16°; much sugar of an inferior quality is sent to China, and a small quantity to Malacca and Singapore. The true cinnamon (*Laurus Cinnamomum*) is probably indigenous; and though its bark is much thicker than that of Ceylon, it is preferred by the Chinese: from 250,000lbs. to 300,000lbs. are annually exported from Faifo.

Cotton is cultivated every where, and largely exported to China, where it fetches twenty per cent. more than that brought from Bengal. Silk is in Tonkin and Cochin-China a general object of attention with the peasantry; that of Tonkin is of better quality, but still inferior to that of China. Tea of a coarse kind is grown in the neighbourhood of the capital Hué, and called Hué tea. It is largely used by the lower classes.

The French missionary, M. de la Bissachère, states the population of Cochin-China at twenty-two millions, of which he assigns eighteen millions to Tonkin. The French officers at the court of Hué differed considerably in their statements to Crawfurd, one estimating the population at from fifteen to twenty millions, and another at ten millions. Crawfurd thinks all these numbers to be considerably exaggerated; and according to his calculation, Cochin-China contains only 5,194,000 souls. But as all authorities agree in describing the plain of Tonkin as very fertile, and extremely well cultivated and peopled, the estimate of Crawfurd seems too low

The natives call the eastern part of their country Anam, which seems to be derived from the Chinese name, which is Ngan-nan. They belong to the same race as the Chinese and Mongols. Their language is monosyllabic, and the signification of the words is, in a great measure, regulated by their accentuation. But the Anamese language is totally different from the Chinese language. The Chinese characters are only used in printing; for common purposes they use others.

The inhabitants of Camboja, who call themselves Kammer, constitute a different nation; they extend on both sides of the river Maekhaun to 15° N. lat. They do not differ from the Anamese in their physical character, but, according to Crawfurd and Dr. Loyden, they speak a different language. Klaproth however thinks that it is only a dialect of the Anamese. In manners, laws, religion, and state of civilization, they bear a nearer resemblance to the Siamese than to the inhabitants of Cochin-China Proper.

On the mountain-range live two independent nations. The Loye or Loi extend from Cape James at least as far as 15° N. lat. They once extended to the very coast, and occupied all Chiampa, but having been expelled from it, they retired into the mountain-fastnesses. Their language differs essentially both from the Anamese and Cambojan. To the north of 15° N. lat. the interior districts of the mountain-range are occupied by another independent nation, called Moi, which extends over a tract of country lying between Laos and Cochin-China, about 120 miles in length, and from 20 to 30 in breadth. They are said to be an uncivilized and inoffensive people. Very little is known of them.

The political division coincides nearly with the historical division of the country. Anam, or the eastern portion, is divided into two provinces—Tonkin the northern, and Cochin-China the southern, and the boundary-line between them, at about 19° N. lat., is nearly the same line which separated the antient kingdom of Tonkin from Cochin-China; only two small provinces have been detached from the former, and added to the latter. That portion of Camboja which has been united to Cochin-China constitutes a province by itself.

1. Tonkin or Tongking comprehends the most northern portion of Anam, or the plain which extends on both sides of the river Song-ca, and is bounded by the mountain-ranges within on all sides. It is the most fertile and most populous portion of Cochin-China, producing rice, cotton, and silk, in great abundance, and exporting extensively all these articles. Its mountains abound in gold, silver, and iron. The capital, Cachao or Cecho, called by the natives also Bakthan, is a large town with 150,000 inhabitants, situated on the banks of the Song-ca, about 80 or 90 miles from the sea. Its commerce in the products of the country is very considerable, especially with China. Hean is on the same river, about 18 miles lower down; the largest junks come up to this place.

2. Cochin-China Proper comprehends the coast from about 19° N. lat. to the neighbourhood of Cape James. The name of Cochin-China is not known to the natives, and was introduced by the Portuguese, who on their arrival in the country found that it was called Koe-chen or Cochin in order to distinguish it from Cochin on the coast of Malabar, they added China, calling it as it were Cochin of China. The natives distinguish it by the name of Dong-traoing or Dang-trong (i. e., the interior or central country); and they call Tonkin Dang-ngoai (the external country). The whole surface is covered with mountains, but towards the north the ridges are separated by wide valleys, sometimes extending to moderate plains, which however towards the south grow narrower, till in the vicinity of Cape Pataran and south of it they become narrow glens. Its principal products are sugar, silk, cinnamon, cardamoms, pepper, &c. The harbours along this coast are numerous, safe, and spacious: there is a considerable number of small towns. The capital is Hué, the metropolis of the whole country. The best and most frequented harbour is Touron or Han. To the south of it is the town of Faifo, with from 5000 to 6000 inhabitants, mostly Chinese, who carry on an active trade with their native country. The large towns of Qui-nhon, Phu-yen, and Nhatrang, are not visited by Europeans. The most southern portion of Cochin-China Proper once formed a separate country, under the name of Chiampa.

3. Camboja extends over nearly the whole of the antient

kingdom of Camboja, only one province of it, Batabang, having been united with Siam. The Chinese name of this country is Kan-phu-tche, from which Camboja is derived. As far as this country is known, it is a level formed by the alluvia of its large rivers, and very fertile and well cultivated. Its principal commercial productions are rice, areca-nuts, betel, spices, and timber. It has mines of iron. Sai-gun, on the river of the same name, may be considered as its present capital, being the seat of the provincial government. Pontaipret or Camboja, on the Maekhaun, was antiently the capital, and a very considerable town when visited by the Dutch in the seventeenth century. Nothing is known of its present condition. Panompeng, or Calompe, was at a later period the capital, and is still the residence of the nominal king of Camboja; it is in a populous and well-cultivated country. Kang-kao is about two miles from the mouth of the Kang-kao river, which forms a shallow port; it has some commerce with Singapore and the countries inhabited by the Malays. The population is about 5000.

The Cochin-Chinese have made some progress in most of the arts of civilized life. Barrow says that they excel in naval architecture, and that their row-galleys for pleasure are remarkably fine vessels; and Crawfurd thinks that the lacker-ware made in Tonkin is preferable to that of Japan. They manufacture great quantities of coarse cotton and silk cloth, but both are inferior to those brought from China. Their articles of filigree work are equal to those of the Chinese, and their vessels of cast-iron are also very good. As they are not acquainted with the art of making steel, their tools are not hard enough, and they prefer the copper tools imported by the Chinese. Fire-arms are largely imported from Europe. Their earthenware is much inferior to that of the Chinese.

The great number of excellent harbours and valuable products would seem calculated to attract foreign vessels to this country. But after the feeble attempts of some European nations to establish a regular trade were frustrated by the long internal wars of the eighteenth century, the commerce of Cochin-China was limited to its intercourse with China. Since the establishment of Singapore, however, an intercourse has been established with that colony, especially by Chinese merchants, and this trade seems to be rapidly increasing. The commerce with China is chiefly limited to the harbours of Cachao, Faifo, and Sai-gun, in Cochin-China, and to Canton, Amoy, Fu-cheou-foo, and Ning-po, in China. In 1822 there were employed in this trade, according to Crawfurd, 116 junks, of about 20,000 tons. They export from Cochin-China rice, cotton, silk, eagle-wood, spices, and some other articles; they import tea, the finer kinds of cotton and silk goods, china, and some other articles of less importance; also opium and English broad-cloth. From Singapore are imported iron, fire-arms, opium, catechu, and terra japonica. Before 1822 this commerce employed a shipping of 4000 tons, mostly Chinese junks; but it is now certainly twice if not three times as extensive. A commercial intercourse is also maintained between Faifo and Sai-gun, and Bang-kok, the capital of Siam, which however is not considerable, as only 40 or 50 small junks are engaged in it. They bring to Bang-kok silk, worked and raw, mattings for sails, &c., and take in return iron, tobacco, opium, and some European goods. (Crawfurd; Barrow; White.)

COCHINEAL is extremely rich in the finest red colouring matter, and has been long employed in scarlet dyeing, and in the manufacture of carmine. [CARMINE.]

Cochineal has been analyzed by Pelletier and Caventou, and they find that it contains—

1. A colouring matter to which they have given the name of carmine, or carminium.
2. A peculiar animal matter.
3. Fatty matter, which is soluble in æther, and consisting of stearine, oleine, and an odorous acid.
4. Phosphate of lime and of potash, chloride of potassium, and carbonate of lime; and potash combined with an organic acid.

Carminium was obtained by Pelletier and Caventou by digesting cochineal in æther; treating the residue repeatedly with boiling alcohol, allowing it to cool; treating the deposit formed with pure alcohol, and then adding a volume equal to its own of pure sulphuric æther; a deposit of carminium is thus formed.

The properties of carminium are that it is solid, uncrystallizable, of a perfect red colour, fuses at 104°; very soluble in water, slightly soluble in pure alcohol, insoluble in sulphuric æther, and in the volatile and fixed oils. Sulphuric acid, nitric and hydrochloric acids when concentrated, iodine and chlorine, destroy carminium; but when diluted, the acids render its colour brighter. Nitric acid, and also ammonia, dissolve it perfectly. Alkaline solutions added to a solution of carminium render it purple, but lime water precipitates it. If gelatinous alumina be added to a solution of carminium, these two substances combine, and the solution is completely decolourized. The lake thus obtained is of a very fine red colour, but it may be rendered crimson by heating it in the liquor in which it is formed. The greater number of saline solutions poured into a solution of carminium render it crimson; sulphate of lime, protochloride of tin, protonitrate of mercury, and submuriate of lead, precipitate it. When heated, carminium is decomposed, but unlike most animal matter, it yields no ammonia by decomposition.

The chief use of cochineal is the dyeing of scarlet; the fine colour which it yields is converted to this tint by means of chloride of tin, usually called muriate of tin, and by the dyer, tin spirits.

The insect which constitutes cochineal feeds chiefly upon the Cactus cochenillifera and C. opuntia. The female insect only is collected. Several varieties are distinguished in commerce, and have different degrees of value attached to them, dependent chiefly upon the different methods employed to kill and dry the insects. When dried they resemble small grains, scarcely so large as a pepper-corn, ovate, convex above, plane below, transversely furrowed, externally blackish-brown, but as if dusted with a white powder, light, friable, the internal substance consisting of extremely small grains, obscurely purple, but when reduced to powder, of a rich purple. Inodorous, but with a bitter-sweet acrid taste. They impart to water or alcohol by digestion an intensely red colour. The colouring principle is termed carmine.

Adulterations are effected either by mixing old insects consisting of the mere skin, or grains artificially prepared, with the genuine.

Cochineal has hitherto been employed mostly as a colouring material, either of tinctures, or of other things, the nature of which it is wished to disguise; but lately it has been stated to possess diuretic and antispasmodic powers, and to be useful in pertussis, or hooping cough. Its claim to this character requires yet to be established by further evidence. Some well-authenticated cases are recorded of the utility of a tincture of cochineal in doses of half a drachm or more twice a-day in removing or mitigating tic-doloureux, or neuralgia faciei douloureux.

COCHINEAL TRADE. (French, *Cochenille;* German, *Koschenilje;* Dutch, *Conchenilje;* Italian, *Coccìniglia;* Spanish, *Cochinilla, Grana;* Portuguese, *Cochenilha;* Russia, *Konssenel.*) Previous to the revolt of the Spanish American provinces almost all the trade in cochineal with the different markets of Europe was carried on through Spain, and chiefly through Cadiz; but since that event, and the consequent removal of the shackles which restricted the trade of Mexico, it has taken a more natural course, and the markets of consumption are supplied with cochineal either direct from the places of production, or from neighbouring stations, to which the article has found its way in the natural course of commerce. Representing a considerable value in a small bulk, cochineal is frequently used, with great convenience to merchants, as a medium for making remittances, and hence the comparatively circuitous route by which the greater part of it reaches the places of ultimate consumption. The trade in this article carried on by this country in each year from 1827 to 1835 has been:—

	Imported.	Re-Exported.	Taken for Consumption.
1827	320,722lbs.	145,756lbs.	171,325lbs.
1828	258,032	158,109	147,819
1829	288,456	153,738	127,954
1830	316,589	100,059	182,217
1831	224,371	168,329	134,222
1832	388,478	138,270	166,900
1833	359,381	130,732	178,246
1834	410,387	265,490	139,860
1835	418,320	352,023	162,596

Of the quantity imported in 1835, two thirds or 278,993lbs. came by way of the British West India Colonies; 42,754lbs. by way of the United States of America; 7218lbs. from va-

rious countries in Europe, among which Spain was not included; 2183lbs. from Cuba; and 87,172lbs. direct from the countries of production, Mexico and Guatemala. Of the quantity exported in the same year, Russia took from us 112,854lbs.; Turkey, 53,339lbs.; India, 64,178lbs.; China, 23,284lbs.; Germany, 37,992lbs.; Holland, 22,564lbs.; France, 10,315lbs.; Italy, 13,893lbs.; other European countries, 12,032lbs.; and Egypt, 1572lbs. The present price (Nov., 1836) in the London market runs, according to quality, from 6*s*. 6*d*. to 8*s*. 9*d*. per lb., exclusive of the duty: this duty was reduced in 1825 from 2*s*. 6*d*. per lb. to 4*d*. per lb. when brought from British possessions, and 1*s*. per lb. when from foreign countries: a further reduction was made in 1826 to one-half these rates, at which the duty remains at present.

COCHLICELLA. [HELICIDÆ.]

COCHLIC'OPA. [HELICIDÆ.]

COCHLIT'OMA. [HELICIDÆ.]

COCHLODI'NA. [HELICIDÆ.]

COCHLODONTA. [HELICIDÆ.]

COCHLO'GENA. [HELICIDÆ.]

COCHLOHY'DRA. [HELICIDÆ.]

COCHLO'STYLA. [HELICIDÆ.]

COCK. [POULTRY.]

COCK OF THE ROCK. [PIPRADÆ.]

COCK OF THE WOOD. [CAPERCAILZIE.]

COCKATOO. [PSITTACIDÆ.]

COCHRANE, CAPTAIN JOHN DUNDAS, R. N., distinguished himself by travelling on foot in a very eccentric manner through France, Spain, and Portugal, and afterwards through Russia and Siberia, to the extremity of Kamtchatka. (See 'Narrative of a Pedestrian Journey through Russia and Siberian Tartary, from the Frontiers of China to the Frozen Sea and Kamtchatka,' 2 vols. 8vo. Lond., 1824.) He subsequently engaged in some of the mining companies in the New World, and died in Colombia at a time, it is said, when he was contemplating a journey on foot through the whole of South America. He tells us in his book, that in January, 1820, immediately before he began his journey to Russia, he made an offer of his services to explore the interior of Africa and the course of the Niger, but this offer was declined by Government. His object, when he left London for St. Petersburg, was to travel round the globe, as nearly as can be done by land, crossing from Northern Asia to America at Behring's Straits. 'I also,' he adds, 'determined to perform the journey on foot, for the best of all possible reasons, that my finances allowed of no other.' But at the seaport of St. Peter and St. Paul's, at the end of the Kamtchatkan peninsula, he became enamoured of a young lady of the country, and his marriage, together with some other circumstances, induced him to return to England, whither he brought his wife. The eccentricities of this most hardy and indefatigable traveller frequently approach to insanity, but his book is amusing from its oddness, and not destitute of curious information concerning countries rarely visited by Europeans.

COCK-PIT, the name for the theatre or area in which game-cocks are made to fight their battles. The sittings of his Majesty's privy council at Westminster are usually held in a room which, being the site of what was formerly the cock-pit belonging to the palace at Whitehall, still bears the name. In a man-of-war the name of cock-pit is given to a place on the lower deck, where there are subdivisions or partitions for the purser, the surgeon, and his mates.

COCK'S-COMB. [CELOSIA.]

COCK'S-FOOT GRASS, a perennial agricultural plant, the *Dactylis glomerata* of botanists, of a coarse, harsh, wiry texture, but capable of growing on the most exposed barren sandy places, and yielding a valuable food for sheep very early in the spring, before its young leaves have had time to become tough.

COCKATRICE. One of the names by which the Basilisk was known. 'Many opinions,' says Dr. Thomas Browne, in his Pseudodoxia Epidemica, 'are passant concerning the basilisk, or little king of serpents, commonly called the *Cockatrice:* some affirming, others denying, most doubting, the relations made hereof.***That such an animal there is, if we evade not the testimony of Scripture and human writers, we cannot safely deny.' This is very true, and it is equally true that the alleged generation of the basilisk, or cockatrice, and the powers attributed to it in antient times, were the most ridiculous fables.

Of basilisks, or cockatrices, there were said to be three, if not four kinds. One species burned up whatever they approached,—a sort of breathing upases, they made a desert wherever they went, for every thing animal and vegetable withered before them; a second were a kind of wandering Medusa's heads, and their look, like Vathek's eye, caused an instant horror, which was immediately followed by death;* the touch of a third caused the flesh to fall from the bones of the wretched animal with which they came in contact; and a fourth, a concentration of evil, was said to be produced from the eggs of extremely old cocks (*ova centenina*), hatched under toads or serpents. There are authors who maintain that this parentage did not belong exclusively to one kind only, but that it was the origin of the whole infernal brood.

The Greek word βασιλισκος is often translated in Latin by the word *Regulus*. When mention is made of these basilisks, or cockatrices, in the Holy Scriptures, nothing appears to occur in the sacred volume beyond words expressive of a very poisonous and deleterious serpent, intended, in the opinion of many commentators, to typify sin, misery, destruction, God's judgments, and the principle of evil, or Anti-Christ. Thus, in Psalm xci. 13, it is written 'super aspidem et basiliscum ambulabis,' which in the old quarto Bible, 'imprinted at London by Robert Barker, printer to the King's most excellent Majestie, 1615,' is translated, 'Thou shalt walke upon the lion and aspe,' and in the more modern editions, 'Thou shalt tread upon the lion and adder.' In the 'Booke of Common Prayer,' by the same printer (Robert Barker), 1613, the passage stands 'Thou shalt goe upon the lion and adder,' and so in the more modern editions. Again, Proverbs xxiii. 32, speaking of the abuse of the wine-cup, 'Mordebit ut coluber et sicut Regulus venena diffundet,' which in the old edition above alluded to is rendered, 'In the end thereof, it will bite like a serpent and hurt like a cockatrice,' and, in the modern version, 'At the last it biteth like a serpent and stingeth like an adder.' So Isaiah xiv. 29, 'Ne læteris, etc., de radice enim colubri egredietur Regulus,' etc., in the old quarto, 'Rejoyce not (thou whole Palestina) because the rod of him that did beate thee is broken: for out of yᵉ serpents roote shal come forth a cockatrice, and the fruit thereof shall bee a fiery flying serpent:' and lix. 5, speaking of the wicked, 'Ova aspidis rumpunt et telas aranearum texunt; qui comederit de ovis ejus morietur, et quod fructum erit, erumpet in Regulum:' in the old quarto, 'They hatch cockatrice egges, and weave the spiders webbe: he that eateth of their egges dieth, and that which is trod upon breaketh out into a serpent,' which the commentator thus explains, 'Whatsoever cometh from them is poison and bringeth death. They are profitable to no purpose.' The present edition reads, 'They hatch cockatrice eggs and weave the spider's web: he that eateth of their eggs dieth, and that which is crushed breaketh out into a viper.' Also Jeremiah viii. 17, 'Ecce ego mittam vobis serpentes Regulos, etc.,' which the same old edition renders, 'For behold I will send serpents and cockatrices among you, which will not bee charmed: and they shall sting you, saith the Lord;' which the commentator explains as follows: 'God threatneth to send the Babylonians among them, who shall utterly destroy them in such sort as by no meanes they shall escape.' The modern edition scarcely varies from the old quarto, except in the substitution of the word 'bite' for 'sting.'

These basilisks were called kings of serpents, because all other dragons and snakes, behaving like good subjects, and wisely not wishing either to be burnt up, or struck dead, or to have their flesh fall from their bones, although they were in full feast upon the most delicious prey, were supposed, the moment they heard the distant hiss of their king, to turn tail in a *sauve qui peut* style, leaving the sole enjoyment of the banquet to the royal monster.

Of the antient profane writers, Aristotle, as might be expected, says nothing about the wonders of the cockatrice but Pliny, who dearly loved a fable, mentions the basilisk more than once: thus (*Hist. Nat.* book viii. c. 21, and book xxix. c. 4) he enters at length into its deadly attributes, and records the praises with which magicians celebrate the efficacy of its blood, which was considered an admirable antidote against sorcery (veneficia). Dioscorides, Galen, Solinus, Ælian, and others, are eloquent upon

* Lady Anne, in answer to Richard's observation on her eyes, says—
'Would they were basilisks to strike thee dead!'

basilisks, as are Avicenna, Grevinus, Scaliger, and many more.

Browne (*Pseudodoxia*) is of opinion that what 'we vulgarly call a cockatrice, and wherein (but under a different name) we intend a formal identity and adequate conception with the basilisk, is not the basilisk of the ancients, whereof such wonders are delivered. For this of ours is generally described with legs, wings, a serpentine and winding tail, and a crist or comb somewhat like a cock: but the basilisk of elder times was a proper kind of serpent, not above three palms long, as some account; and differenced from other serpents by advancing his head, and some white marks or coronary spots upon the crown; as all authentic writers have delivered.' The following is Pliny's description (*Hist. Nat.* viii. 21). After stating that the basilisk, like the beast catoblepas, slays with its eye, he proceeds:—'The Cyrenaic province produces him of the greatness of not more than twelve fingers, and remarkable for a white spot, like a diadem, on his head. He drives away all serpents by his hissing, nor does he impel his body like the rest by a multiplied flexion, but advances lofty and upright (celsus et erectus in medio). He kills the shrubs, not only by contact, but by breathing on them, scorches up the green herb, and splits the rocks: such power of evil is there in him. It was formerly believed that if killed by a spear from on horseback, the power of the poison conducted through the weapon killed not only the rider, but the horse also.' To this Lucan alludes in these lines:—

> Quid prodest miseri basiliscus cuspide Mauri
> Transactus? velox currit per tela venenum,
> Invaditque manum.'

Such a prodigy was not likely to be passed over in the legends of the saints. Accordingly we find that a good man (vir quidam justus) going to a fountain in the desert suddenly beheld a basilisk. He immediately raised his eyes to heaven, and with a pious appeal to the Deity, laid the monster dead at his feet. A somewhat similar miracle is related of the abbot St. John, who, by prayer, slew a basilisk that lay hid in the bottom of a deep well, and reduced the monks of a monastery built by him to the greatest distress for want of water. Leo IV., by a similar piety, is said to have delivered Rome from a basilisk whose breath afflicted the inhabitants with a terrible pestilence in his pontificate.

Jonston enumerates the attributes of the basilisk in silence, till he comes to its alleged power of annihilating with the eye; when he sagely remarks, 'Intuitu interimere vix crediderim, quis enim primus vidisset?' 'I would scarcely believe that it kills with its look, for who first could have seen it?' The worthy physician was not aware that those who went to hunt the basilisk of this sort, took with them a mirror which reflected back the deadly glare upon its author and, by a kind of poetical justice, slew the basilisk with its own weapon.

It is curious to observe that Browne, who treats most of the fables about the basilisk with contempt, is still unable to resist the story of its killing with the eye. We think we can trace a little of the sympathetic theory maintained by Sir Kenelm Digby and others, in the following passage: 'According to the doctrine of the antients, men still affirm that it killeth at a distance, that it poisoneth by the eye, and by priority of vision. Now that deleterious it may be at some distance, and destructive without corporal contraction, what uncertainty soever there be in the effect, there is no improbability in the relation. For if plagues or pestilential atoms have been conveyed in the air from different regions; if men at a distance have infected each other; if the shadows of some trees be noxious; if torpedoes deliver their opium at a distance, and stupify beyond themselves; we cannot reasonably deny that (besides our gross and restrained poisons, requiring contiguity unto their actions) there may proceed from subtiller seeds more agile emanations, which contemn those laws, and invade at a distance unexpected. That this venenation shooteth from the eye, and that this way a basilisk may empoison, although thus much be not agreed upon by authors, some imputing it unto the breath, others unto the bite, it is not a thing impossible. For eyes receive offensive impressions from their objects, and may have influences destructive to each other. For the visible species of things strike not our senses immaterially, but, streaming in corporal raies, do carry with them the qualities of the object from whence they flow, and the medium through which they pass. Thus, through a green or red glass, all things we behold appear of the same colours; thus, sore eyes affect those which are sound, and themselves also by reflexion, as will happen to an inflamed eye that beholds itself long in a glass; thus is fascination made out; and thus also it is not impossible what is affirmed of this animal; the visible raies of their eyes carrying forth the subtilest portion of their poison, which, received by the eye of man or beast, infecteth first the brain and is from thence communicated unto the heart.'

But, if the author of the 'Inquiries into Vulgar and Common Errors' here shows something of the lingering look with which most men regard received prejudices, he makes amends by declaring war against the story of the mode of the cockatrice's production. 'As for the generation,' says he, 'of the basilisk, that it proceedeth from a cock's egg hatched under a toad or serpent, it is a conceit as monstrous as the brood itself.' Jonston, who appears to regard with a proper horror most of the nefarious proceedings of the cockatrice, treats this part of the subject quite professionally. 'Quomodo,' remonstrates the sage doctor of medicine, 'formari a gallo intra ovum possit cum utero destituatur non video.' It is supposed that this idea took its rise from an Egyptian tradition concerning the ibis; 'for an opinion it was of that nation, that the ibis feeding upon serpents, that venomous food so inquinates their ovall conceptions, or eggs within their bodies, that they sometimes came forth in serpentine shapes; and therefore they alwaies brake their eggs, nor would they endure the bird to sit upon them.' (Browne.) Baptista Porta is of opinion that if a hen's egg be placed in a ditch full of serpents, corruption (tabes), arsenic, and other poisons, it will produce an animal noxious to the sight and touch: at the same time he puts the experimentalist on his guard, lest in trying to produce this animal he might (like Frankenstein) give birth to a creature that would do him a mischief.

But what was to attack this terrible and unapproachable monster? There is an old saying 'that every thing hath its enemy;' and the cockatrice quailed before the weasel. (Pliny, Solinus, and others.) The basilisk might look daggers, the weasel cared not:—in he went to the scratch. When it came to biting, the affair became more serious; but the weasel retired for a moment to eat some rue, which, of course, was the only plant the basilisks could not wither, and was always growing where they lay—returned to the charge, and never left the enemy till he was stretched dead before him. So that when men found out the den of a basilisk, they had only to turn in a weasel and the thing was done. The monster, too, as if conscious of the irregular way in which he entered the world, was supposed to have a great antipathy to a cock; and well he might, for, as soon as he heard the cock crow, he expired. This we learn from Ælian; and African travellers, consequently, carried with them the 'bird of dawning' as a specific against cockatrices.

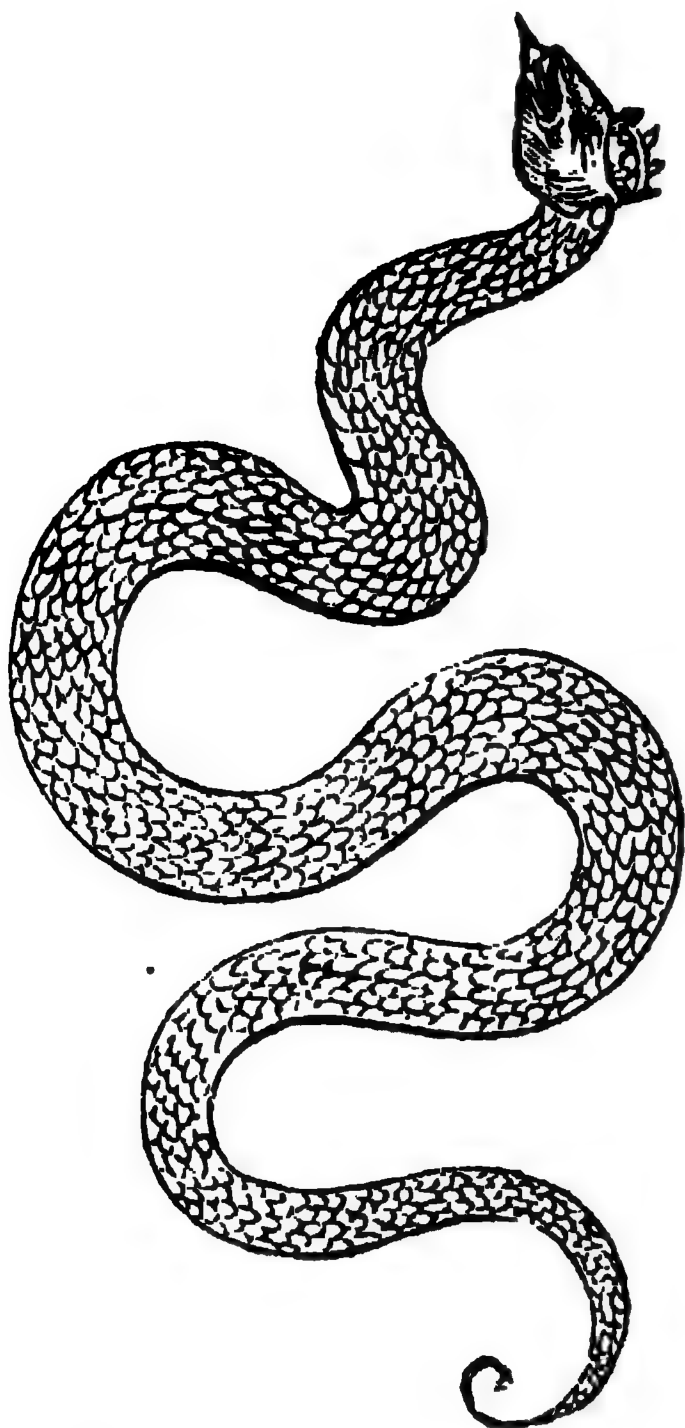
The basilisk was of some use after death. Thus we read that its carcase was suspended in the Temple of Apollo, and in private houses as a sovereign remedy against spiders' webs, and that it was also hung up in the Temple of Diana, for which reason no swallow ever dared to enter the sacred place.

The reader will, we apprehend, by this time, have 'supped full' of absurdities, but still we can imagine his anxiety to know what a cockatrice was like. We therefore subjoin from Aldrovandus, in whose work he will find two others made out of skates (Raia), a couple of figures, one of which he seems to owe to Cardan, and the other to Grevinus. In both it will be seen that

> 'What seemed his head
> The likeness of a kingly crown had on.'



[Basiliscus in solitudine Africæ vivens.]



[Basiliscus, sive Regulus, Grevini.]

In these cuts will be seen an example of the 'Somnia portentaque Thessala,' which have vanished before the light of science. [BASILISK.]

COCKER, EDWARD. This writer, whose name is so well known in England, was born about 1631, as appears from the inscription to one of the portraits cited by Granger in his Biographical History of England. He was an engraver, and a teacher of writing and arithmetic. He is said to have published fourteen books of exercises in penmanship, some of them on silver plates. One of these is in the British Museum, namely, 'Daniel's Copy Book, &c. &c. Ingraven by Edward Cocker, Philomath. London, 1664.' The matter of these exercises in penmanship consists in great part of descriptions of hell-fire, with fiends (or something very like them) in flourishes. We have also 'Cocker's Urania, or the Scholar's Delight,' without date; and 'Cocker's Morals, or the Muses' Spring Garden,' London, 1694 (either a late edition, or a posthumous work). Cocker died before 1677, and certainly later than 1671.

The celebrated work on arithmetic was not published by Cocker himself, but as described in the following title-page:—'Cocker's Arithmetic: being a plain and familiar method, suitable to the meanest capacity for the full understanding of that incomparable art, as it is now taught by the ablest schoolmasters in City and Country. Compos'd by Edward Cocker, late practitioner in the arts of Writing, Arithmetick, and Engraving. Being that so long since promised to the world. Perused and published by John Hawkins, Writing Master near St. George's Church in Southwark, by the Author's correct copy, and commended to the world by many eminent Mathematicians and Writing Masters in and near London.' The first edition was in 1677; the fourth in 1682; the *thirty-seventh* in 1720. We have never seen the first edition: there is no copy of any edition either in the British Museum, the libraries of the Royal Society or London Institution, or (so far as the old catalogues go) in that of Sion College, or of the Faculty of Advocates at Edinburgh. We have copied the title-page from a mutilated copy of the 37th edition, being the only one we ever saw exposed for sale in London.

Cocker's Arithmetic was the first which entirely excluded all demonstration and reasoning, and confined itself to commercial questions only. This was the secret of its extensive circulation. There is no need of describing it; for so closely have nine out of ten of the subsequent school treatises been modelled upon it, that as large a proportion of our readers would be able immediately to turn to any rule in Cocker, and to guess pretty nearly what they would find there. Every method since his time has been 'according to Cocker.'

There are two other works which bear the name of Cocker, and both published by the same John Hawkins. (1.) Decimal Arithmetic, accompanied by Artificial Arithmetic (logarithms) and Algebraical Arithmetic: London, 1684 and 1685. (2.) Cocker's English Dictionary, the second edition of which bears date London, 1715. Now, since in 1677 Cocker had been dead some time, as appears by Hawkins's preface to the Arithmetic, and since Kersey's Algebra, on which Cocker's is professedly founded, was published in 1673, it will appear only just possible that Cocker could have lived to have written this work. Again, the Arithmetic was written by a person who understood Latin, as proved by apt quotations from Oughtred and Gemma Frisius: the Decimal Arithmetic is entirely without quotations, though abounding in subjects on which the author of the Arithmetic might be expected to quote. Lastly, to the preface or the Decimal Arithmetic is annexed a very clumsy attempt at a cipher, which seems utterly unmeaning, unless it be considered as wrapping up a confession of authorship. Deciphered, it is as follows:—'Amico suo amantissimo Johanni Perkes, Ptochotrophii Fohliensis in Comitatu Wigorniensi ludimagistro. Sir, if you pleas to bestow some of your spare hours in perusing the following treatise, you will then be the better able to judg how I have spent mine, and if my paines therein may be profitable to the publick I have my wish, but if not, it is not a good thing now indeed I do say so. Sir, I am your humble servant John Hawkins.' From all that precedes we are inclined to suspect that Hawkins, being in possession of Cocker's papers, and finding the Arithmetic a successful work, published others of his own in Cocker's name, perhaps with some assistance from the manuscripts of the latter.

COCKERMOUTH, a parliamentary borough and market town in the west division of the county of Cumberland. The township is in the parish of Brigham, in the ward of Allerdale above Derwent. Before the alterations effected by the Reform Act, it was co-extensive with the borough; but the borough, since the enlargement of its boundary, includes, besides the township of Cockermouth, those of Brigham, Bridekirk, Papcastle, Eaglesfield, and a portion of the township of Dovenby. The town is 25 miles S.W. from Carlisle, and 299 N.N.W. from London. Its name is derived from its position on the river Cocker, at the point of its confluence with the Derwent. The Cocker flows from Buttermere-water, and after passing through Crummock-water, divides the town of Cockermouth into two equal parts which communicate by a stone bridge. The Derwent, after it has received the Cocker, is also crossed by a handsome bridge, erected in 1822, at a cost of 3000*l*. The township occupies the site of the antient barony of Allerdale. The ruins of the castle which formerly was the baronial seat of the lords of Allerdale, and now the property of the earl of Egremont, stand on the brow of a bold eminence near the confluence of the rivers. It is supposed to have been erected shortly after the Conquest, though the Norman architecture of the remaining walls, which are of prodigious thickness, appears to be of the fourteenth century. The area enclosed by the outer walls consists of two courts. Beneath the gateway between them are two deep and vaulted dungeons capable of containing 100 prisoners: and under a building in the larger court is a spacious chamber with a vaulted roof supported in the centre by a single octagonal pillar. Lysons, in their 'Magna Britannia,' give a detailed description and a drawing of this castle (vol. Cumberland, p. 44. See also Brayley and Britton's *Beauties of England*). It was occupied by the parliament army during the civil war in 1648, and sustained a month's siege by the royalists. Since that time it has gradually been decaying, and is now habitable only in a small part. Among the antiquities which have been found, is a font of green-coloured stone, inscribed with Runic and Saxon characters. It is also worthy of remark that to the north of the town is a tumulus called Foot Hill, and to the west the rampart and ditch of a Roman camp. Cockermouth is pleasantly situated in an agricultural district, and has a promenade a mile in length on the banks of the Derwent, but the streets in some parts are narrow and confined. It is recorded that the plague in 1677 was fatal to nearly 200 of its inhabitants. The number of houses in 1834 was 1002. They are chiefly of stone, with roofs of slate, but only a few are of the better class. The town is well supplied with water, but the streets are deficient in lights and foot-pavements, and the general appearance of the place ex-

hibits no disposition for improvement. The town-house, called Moot Hall, is the only building worthy of particular notice.

The population in 1831 was 4536, of whom 2111 were males, and 2425 females. There were then 128 families employed in agriculture, and 623 families employed in trade, manufactures, and manual labour. The population of the borough, enlarged as stated above, is 6022. Cotton, linen, and woollen fabrics are manufactured; also hats, hosiery, and paper: with the tanning and dressing of leather.

The elective franchise was first granted to the borough in the reign of Edward I.; but it appears not to have been exercised until it was renewed under Charles II. It continues to send, as formerly, two representatives to parliament, and it is the place where the court of election is held for the western division of the county of Cumberland. The quarter sessions are alternately held here and at Carlisle. There is a free school which was founded in the time of Charles II., and over the school-house a parochial public library consisting of 500 volumes. There is also a subscription library, a dispensary, a Sunday-school, and four friendly societies. The living is a chapelry, in the diocese of Chester, and places of worship are established by several sects of dissenters. The Rev. John Fell, who wrote on the 'Demoniacs,' 'Rowley's Poems,' &c., was a native of Cockermouth. On the first Monday in May, and on the 10th of October, there are fairs, chiefly for horned cattle and horses. (*Boundary Report*, part i., p. 95; Lysons's *Mag. Brit.*; *Population Report*, 1831.)

COCKLE. [CONCHACEA.]

COCKNEY, a term of contempt for a Londoner, borrowed originally from the kitchen. A cook, in the base Latinity, was called *coquinator* and *coquinarius*, from either of which Cokenay, as Chaucer uses it in the 'Reve's Tale,' might be derived

> 'And when this jape is told another day,
> I shall be halden a daffe or a cokenay.'

In some rhymes ascribed to Hugh Bigot, which Camden published in his 'Britannia,' London itself appears to be alluded to under the name of Cockeney:

> 'Were I in my castle of Bungey,
> Upon the river Waveney,
> I would ne care for the king of Cockeney.'

The author, says Tyrwhitt, in calling London Cockeney, might possibly allude to that imaginary country of idleness and luxury which was antiently known by the name of *Cokaigne*, or *Cocagne*; a name which Hickes (*Gram. Anglo-Sax.*, p. 231) has shown likewise to be derived from *coquina*. Boileau, in his 'Satires,' speaks as if the French metropolis had the same appellation bestowed upon it (*Sat.* vi.):

> 'Paris est pour un riche un païs de Cocagne.'

The name of the festival of *La Cocagna* at Naples, described by Keysler, vol. ii. p. 369, appears to have the same origin.

(Tyrwhitt's *Notes on Chaucer*, 4th edit. vol. ii. p. 437; Brand's *Popular Antiquities*, vol. i. p. 65; Nares's *Glossary, in voce*.)

COCKROACH, the common name for the Blatta orientalis. [BLATTIDÆ.]

COCKSCOMB. [CELOSIA.]

COCOA-NUT. [COCOS.]

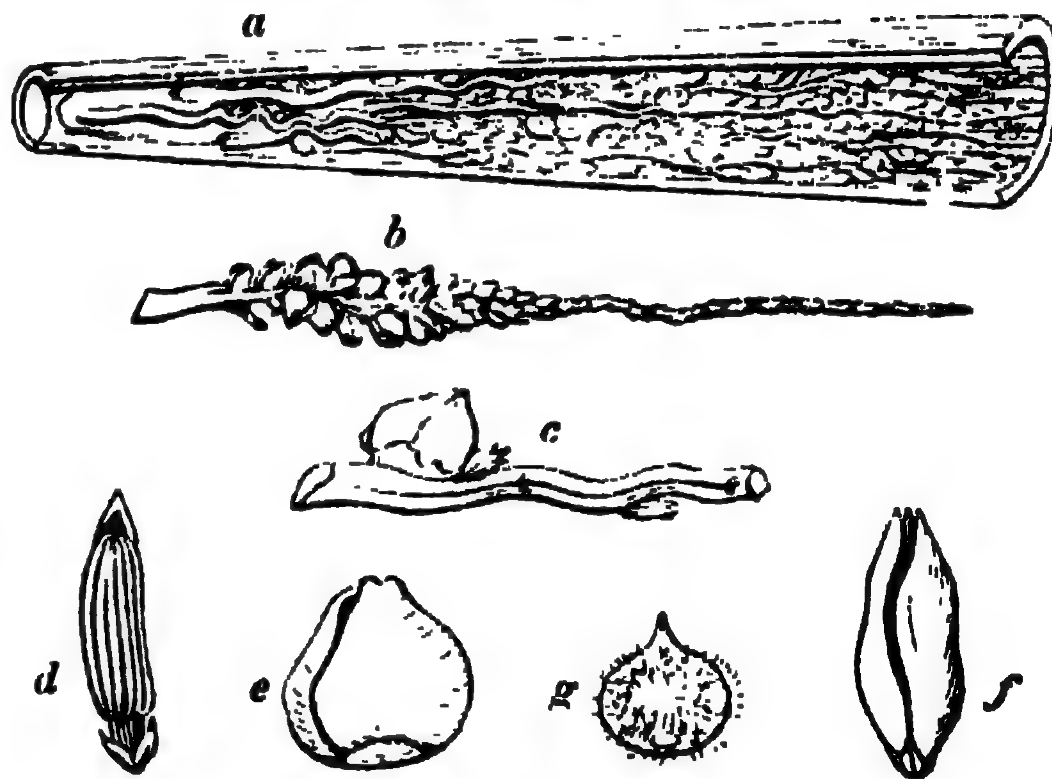
COCOA-PLUM, the fruit of *Chrysobalanus Icaco*.

COCOON. [PUPA.]

COCOS, a genus of palms thus defined by Von Martius. Both male and female flowers on the same spadix. Spathe simple; flowers sessile. Males: calyx three-leaved; corolla of three petals; stamens six; a rudiment of a pistil. Females: three sepals and three petals rolled together; ovary three-celled; stigmas three, sessile; drupe fibrous; putamen with three pores at the base; albumen homogeneous, hollow; embryo next one of the pores at the base; stems either lofty or middle-sized, slender, ringed, or crowned by the bases of the petioles, with a pale fibrous wood; leaves pinnated; the pinnæ lanceolate or linear; flowers pale yellow; drupes brown, green, or orange colour, rather dry. The genus contains several species, the most interesting of which is the common cocoa-nut, *Cocos nucifera*.

This plant is found all over the tropical parts of the world, especially in the vicinity of the sea, growing within reach of





Cocos nucifera.

a, lower portion of the spathe opened; *b*, branchlet, with female flowers—the males on the upper end dropped off; *c*, female flower; *d*, stamens; *e*, female corolla; *f*, male corolla; *g*, germen.

salt water, and establishing itself upon reefs and sandbanks as soon as they emerge from the ocean. Its principal range is said by Mr. Marshall to be between the equator and the 25th parallel of latitude, and in the equinoctial zone to an altitude of about 2900 feet. Its great importance to man has caused it to be cultivated wherever the climate is favourable to its growth; and accordingly it is sometimes found occupying extensive tracts to the exclusion of all other trees: the whole Brazilian coast from the river San Francisco to the bar of Mamanguape, a distance of 280 miles, is, with few breaks, thus occupied; and it was estimated that in the year 1813 no fewer than 10,000,000 trees were growing on the south-west coast of Ceylon.

The cocoa-nut palm rises like a slender column to from 60 to 90 feet in height; its stem is of a soft fibrous nature, and is marked on the outside by rings produced by the fall of its leaves; two such leaves are said to drop off annually, and consequently the age of an individual is equal to half the number of the annular scars of its stem. About a dozen or fifteen leaves, each from 12 to 14 feet long, crown the summit of the stem; and as these are not inaptly compared to gigantic ostrich feathers, they give the plant the air of an enormous tuft of vegetable plumes. A reticulated

substance resembling coarse cloth envelops the base of each leaf-stalk, but falls off before the leaf is full grown. The flowers proceed from within a large pointed spathe, which always opens on the under side. In wet seasons the tree blossoms every five or six weeks, so that there are generally fresh flowers and ripe nuts on the tree at the same time; there are commonly from five to fifteen nuts in a bunch; and in good soils a tree may produce from eight to twelve bunches, or from 80 to 100 nuts annually.

In hot countries the uses to which the cocoa-nut tree is applicable are innumerable. The roots are chewed in place of the areca-nut; gutters, drums, and the posts of huts are formed from the trunk; the young buds are a delicate vegetable; shade is furnished by the leaves when growing, and after separation from the tree their large size and hard texture render them invaluable as thatch for cottages; they are moreover manufactured into baskets, buckets, lanterns, articles of head-dress, and even books, upon which writing is traced with an iron stylus. Their ashes yield potash in abundance: their midrib forms oars; and brushes are formed by bruising the end of a leaf with a portion of the midrib adhering to it. From the juice of the stem, a kind of palm wine, and subsequently an ardent spirit, are prepared; the farinaceous matter contained in the stem is a good substitute for sago; and a coarse dark-coloured sugar, called jagghery, is obtained from inspissating the sap. This jagghery, mixed with lime, forms a powerful cement, which resists moisture, endures great solar heat, and will take a fine polish. The ripe fruit is a wholesome food, and the milk it contains a grateful cooling beverage; indeed these together constitute the principal sustenance of the poorer Indians in many countries. The fibrous bark is used to polish furniture, as brushes, and to form a valuable elastic cordage, called *coir;* the fibrous matter is also employed to stuff mattresses. The shell is manufactured into drinking-vessels and vessels of measure; and finally, the albumen, or white solid matter contained within the shell, yields by pressure or decoction an excellent oil; the former is the method usually employed. This oil is not only employed for burning, but in the manufacture of torches, and in the composition of pharmaceutical preparations; and mixed with dammer (the resin of *Shorea robusta*) it forms the substance used in India for paying the seams of boats and ships.

The name cocoa seems to be a contraction of the Portuguese *macoco* or macaco, a monkey, and to have been given from the resemblance between the end of the shell, where the three black scars are, and the face of a monkey. These three scars indicate the places through which the three embryos of the fruit, if equally and completely developed, would be protruded. But as out of the three ovules originally formed in the cocoa-nut two are constantly abortive, it happens that one only of the scars has to fulfil its destined purpose: that one is known by its being easily pierced by a pin; the others are as hard as the remainder of the shell. It is immediately below the soft scar that the embryo of the cocoa-nut is formed, and the use of the scar is to allow of a passage through the shell of the nut for the germinating embryo, which, without this wise contrivance, would be unable to pierce the hard case in which it is confined.

Cocoa-nuts are brought to Europe as wedges to set fast the casks and other round packages in the cargo of vessels; their freight therefore costs nothing.

COCUMI'GLIA, the name of a kind of plum (Prunus Cocumilia) found wild in Calabria, and having the reputation of being a powerful febrifuge. It is described as bearing a general resemblance to the cultivated plum, but with short double peduncles, elliptical-obovate leaves, which are smooth, crenelled, and tapering to each end, the crenelling and the petioles covered with deciduous glands, and with ovate-oblong fruit of a dull tawny yellow colour, with a slightly incurved point, and an austere astringent flavour. It is abundant about Sile, and on the mountains which overlook Monteleone, Staiti, Cotrone, and Mesoraca, on the sides exposed to the sea, as far as the height of about 3000 feet. The bark of this species is in extensive use for the cure of the intermittent fevers of Calabria, both in private practice and in the military hospitals, where it is preferred to cinchona. The bark of the root is principally employed either in decoction or extract; and its valuable qualities are attested by Savaresi, Polizzi, Tenore, and other Neapolitan physicians. The medicinal properties of the Cocumiglia are said to have been discovered by a noble citizen of Monteleone, who annually caused a considerable quantity of the extract to be prepared and distributed among the Calabrian peasantry. It is worthy of notice that febrifugal properties are assigned by Mérat to the bark of the common sloe; and, considering the very close affinity between the cocumiglia, the sloe, the bullace, and the common cultivated plum, it is highly probable that similar qualities are possessed by all of them. The bark should be collected in the months of November, December, or January.

CODDY MODDY, a gull in its first year's plumage. (Montagu.)

CODE, CODEX. Before the use of more convenient materials, wooden tablets were employed by the antients for writing on. Such a written tablet was called codex, of which codicillus is a diminutive. First they wrote by making notches or indents in these tablets, but afterwards they covered them with wax, and used a style to write with.

The notion of the word was then extended, and it has now several significations. 1. Codex may denote any handwriting on parchment or paper. 2. The diminutive codicillus signifies a less solemn last will or testament. [Codicillus.] 3. A collection of laws is also called codex, or code in modern languages, as in English and French. In this sense the word is now most commonly used. There are several kinds of codes. A code may be made by merely collecting and arranging in a chronological or systematical order the existing laws of a state, which have been made at various times by the sovereign power. Such a collection is either made by public authority, as was the case with the Codex Theodosianus [Theodosian Code] and Codex Justinianeus [Justinian Code and Roman Law], or by private individuals, as is the case with the Codex Gregorianus and Hermogenianus. The Germans call collections of old German laws, made in the middle ages, 'Rechts bücher' (books of rights). Very different from a mere compilation of existing laws is a code (in German *Gesetzbuch*, book of laws), by which the legislative power sets up a new system of laws. A mere arrangement and classification of existing laws is more properly called a Digest. If to this classification and arrangement selection be superadded, it would still be properly only a Digest. A code, though it may adopt many existing laws and customs, is now generally used to express a complete new system, founded on new fundamental principles; such principles, for instance, as are set forth in Bentham's 'Leading Principles of a Constitutional Code for any State.' In England, for example, if it were proposed to make a code, it might be found useful or necessary to modify the law of tenures, or to abolish certain kinds of tenures, such as customary tenures; and also to provide positive rules for numerous cases that are still either totally unprovided for or left doubtful by conflicting decisions, or regarded as of little authority.

CODEIA, an alkali existing in Opium.

CO'DES, LES CINQ, is the name given to several compilations of laws, civil and criminal, made in France after the revolution, and under Bonaparte's administration. They consist of the Code Civil, Code de Procédure Civile, Code de Commerce, Code d'Instruction Criminelle, and Code Pénal. To these has been added the Code Forestier, or regulations concerning the woods and forests, promulgated under Charles X. in 1827. Hence the whole collection is sometimes called 'Les Six Codes.' But even this number is not correct, as there are also a Code de la Conscription and a Code Militaire, both published under Napoleon. These two last are treated under Conscription and Mutiny Act.

Civil Code.—The old laws of the French monarchy were founded partly on the Roman law, partly on the numerous different customs of the various provinces, and partly on the ordinances of the kings. Having been abrogated at the revolution, several attempts were made, by Cambacérès among others, to form a code of laws in accordance with the altered state of society; but the fury of the internal factions, the cares of foreign war, and the frequent changes of rulers, prevented any calm deliberation on the subject during the first years of the revolution. After Bonaparte became first consul, he appointed, in 1800, a commission, consisting of Tronchet, president of the Court of Cassation, Bigot de Préameneu, Portalis, and Malleville, to draw up a project of a civil code. The project was printed early in 1801, and copies were sent to the different courts of France for their observations and suggestions. The ob-

servations and suggestions were likewise printed, and the whole was then laid before the section of legislation of the council of state, consisting of Boulay, Berlier, Emmery, Portalis, Roederer, Real, and Thibaudeau. Bonaparte himself, and Cambacérès, his colleague in the consulship, took an active part in the debates. The various heads of the code were successively discussed, after which they were laid before the tribunate, where some of the provisions met with considerable opposition. The code however passed at length both the tribunate and the legislative body, and was promulgated in 1804 as the civil law of France, 'Code Civil des Français.' Under the Empire its name was changed into that of Code Napoléon, by which it is still often designated, though it has now officially resumed its original title of Code Civil. This code affects to define the civil rights of Frenchmen, and their legal relations to each other, and to society at large. In its general arrangement and distribution it resembles the Institutions of Justinian; like them, it has adopted the great distinction of laws concerning the person, and laws concerning property. It consists of three books, divided into titles or heads, each of which is subdivided into chapters and sections. Book I., in eleven heads, treats of persons; specifies their civil rights; regulates the means by which their rights are certified: prescribes the mode of registering births, marriages, and deaths; defines the conditions constituting the legal domicile of each individual; and provides for cases of absence. It then treats of marriage as a civil contract, the forms required, the obligations resulting from it, and lastly, of separation and divorce. The articles concerning divorce, which gave rise to much debate and opposition at the time, have been repealed since the Restoration, and separation alone is now allowed. The code proceeds to treat of the relations of father and son, of legitimate and natural children, of adoption and guardianship, and of paternal power. Under this last head the French code, without adopting the rigid principle of the old Roman law in its full extent, gives to a father the right of imprisoning his son during his minority for a term not exceeding six months, by a petition to that effect, addressed to the president of the local court, who, after consulting with the king's attorney, may give the order of arrest without any other judicial forms being required. The remaining heads treat of minority and emancipation; majority, which is fixed, for both sexes, at 21 years complete; of interdiction, and the council of trustees appointed in certain cases to administer the property of a man who is incapable of doing it himself. Book II. treats of property and its various kinds and modifications. The 1st head draws the distinction between *meubles* and *immeubles*, or personal and real property; though these two words do not exactly express, to an English lawyer, the distinction between *meubles* and *immeubles*. The 2nd defines the different rights of ownership. The 3rd treats of usufruct, use, and habitation. The 4th concerns rural servitudes, the *prædiorum servitutes* of the Roman law, excluding all former personal servitudes which were abrogated at the revolution. Book III. treats of the various modes by which property is legally acquired, such as inheritance, donation inter vivos, and wills or testaments. A father can dispose by testament of one-half of his property if he has but one legitimate child, of one-third only if he has two, and of one-fourth if he has three or more. The law then proceeds to treat of contracts or conventional obligations, specifying the modes of proving them by written documents, official or private, or by witness, or lastly by presumption. The 5th head treats of the marriage contract, and the respective rights of husband and wife according to the various stipulations, either by community or separation of property, or by dowry. Next come the heads of sales, exchanges, leases, partnerships, loans, deposits, and sequestration. The 12th head concerns the contracts called aléatoires, which depend in a great measure upon chance, such as insurance, annuities, &c. The law treats next of power of attorney, of bail and security, and of amicable compromise. The 18th head concerns privileged creditors and mortgages. This subject is very elaborately treated, and has been much extolled as a very valuable part of the Civil Code, on account of the security which it gives to property by means of the public offices for registering mortgages, of which there is one in every district. The registration of mortgages has been adopted in most of the Italian states, and other countries besides France; but even this system is not considered perfect, because there is no obligation to register every sale or transmission of property, nor the servitudes affecting property and because the French code admits of sales by private contract, and of mortgages in favour of minors or wives, even without registration. In this particular the Austrian code is considered superior, because it enforces the registration of every transmission of property, and of every burthen or servitude, on the book of census, or cadasto, for each district. (See also Grenier, *Traité des Hypothèques*, 1824: *Introduction*.) The nineteenth head of the French civil code treats of expropriation or seizing, or selling off by execution; and the twentieth, or last, of prescription.

Much has been written on the merits and defects of this celebrated code. In order to judge of its value, we ought to read the reports of the discussions in the council of state by the most distinguished jurists of France. (Locré, *Esprit du Code Napoléon tiré de la Discussion*, 6 vols., 8vo., 1805; and Malleville, *Analyse raisonnée de la Discussion du Code Civil au Conseil d'Etat*, 4 vols., 8vo., 1807.) On the other side, several distinguished German jurists have pointed out its imperfections. (Savigny, *On the Aptitude of our Age for Legislation*, translated from the German by a barrister of Lincoln's Inn; Rehberg, *über den Code Napoléon*, Hanover, 1814; Thibaut, Schmidt, &c.) With regard to the part which Bonaparte took in its discussion, not of course as a professional man, but as a quick-sighted observer and critic, a lively account is given in Thibaudeau's *Mémoires sur le Consulat*, in which his own original expressions are preserved.

Code de Procédure Civile.—The Code Civil having determined what was law, it remained to prescribe the forms of civil process and the practice and rules of the courts. The Code de Procédure is divided into two parts. The first part treats of the various courts: 1st. Of the justices of peace and their jurisdiction. There are about 2840 of these magistrates in France, who decide petty cases not exceeding 300 francs, and also act as conciliators between parties at variance, who are not allowed to plead before a court without having first appeared before the juge de paix. 2nd. Of the process before the tribunaux de première instance, which try civil cases without jury. There is one of these courts in every arrondissement. 3rd. Of appeals to the Cours Royales, of which there are 27 established in the larger towns, each having several departments under its jurisdiction: these courts try cases by jury. 4th. Of various modes of judgment. 5th. Of the execution of judgments. The second part treats of the various processes for the recovery of property, separation between husband and wife, interdiction and cession of property by an insolvent debtor. Foreigners are excluded from the benefit of the *cessio bonorum*. The code then passes to the subject of inheritance, the affixing of seals, taking inventories, &c. The last book treats of arbitration. The Code de Procédure was in great measure founded on the ordonnance of 1667 of Louis XIV., with considerable ameliorations. It was framed by a commission appointed in 1800, then discussed in the council of state and the tribunate, and lastly passed by the legislative body. It was put in force in January, 1807. 'An orator of the government, using the licence of flattery, said in his report that the principal difficulties in definitively settling the code had been cleared up by the emperor himself, who had adapted the forms to the present wants of society. The fact is that Napoleon took no part in the discussion of this code, which was conducted during his journeys to Italy and to the camp of Boulogne, and during the campaign of Austerlitz. Besides, it was a dry and unattractive subject, very unlike that of the Civil Code, and the emperor finding himself a complete novice in it, gave it up entirely to professional lawyers. His general views would have been to simplify the forms, and to check the sources of chicanery, but he was not heeded. One of his ideas was that solicitors and counsellors should not be paid unless they gained the cause. The routine lawyers, however, had too much influence in the work.' (Thibaudeau, *Histoire de France sous Napoléon*, vol. v., p. 124-5.) The government afterwards published a table of the expenses, duties, fees, &c. attending civil process. The table, which is given at the end of the collection of the codes, presents a formidable appearance by the multiplicity and minuteness of the charges which attend every step of legal proceedings. Indeed this is the principal reproach made against the Code de Procédure, the multiplicity of formalities, written acts, registrations, stamps, &c. Another objection is, that in actions in which the state is concerned, it has advantages over private parties. But the publicity of the discussions, the security to all civil proceedings by

means of registration, the well-defined authority of the various courts, the independence of the judges, and the establishment of local courts all over the country, and above all the institution of the supreme Court of Cassation—these are essential and lasting advantages.

The *Code de Commerce* was promulgated in January, 1808. It was founded in some measure upon the ordonnances of 1673-81 of Louis XIV. Next to the Civil Code, it is considered the best part of French legislation. The institution of the commercial tribunals has been of great advantage to France, and has been adopted in other countries. These courts, of which there are 213, consist of a president and two or more judges, all chosen by the merchants among themselves, and for a time; they are not paid, but the greffier or registrar receives a salary. The Code de Commerce consists of four books: the first treats of commerce in general, of the various descriptions of commercial men, of the keeping of books, of companies and partnerships, of brokers, commissioners, carriers, &c.; the second treats of maritime commerce, shipping, insurances, &c.; the third concerns bankruptcies; and the fourth treats of the commercial tribunals, their jurisdiction and proceedings. Appeals for cases above 1000 francs lie to the cour royale of the district.

Code d'Instruction Criminelle.—The criminal laws of France under the old monarchy were defective, confused, and arbitrary. There was no penal code, but there were various ordonnances for the punishment of particular offences. The ordonnance of Louis XIV. for regulating proceedings in criminal cases introduced something like uniformity, but it maintained torture, which in some cases was repeated, secret trial, and other anomalies of the legislation of the middle ages. Torture was abolished by Louis XVI. The first National Assembly in 1791 recast the criminal legislation, introduced the jury, and remodelled the criminal courts after those of England. Then came the reign of terror, with its exceptional laws, or rather no laws at all but the caprice of the ruling faction. Bonaparte, when first consul, appointed a commission, consisting of Viellard, Target, Oudard, Treilhard, and Blondel, to frame a project of a criminal code. The fundamental laws were laid down in 1801, and were then discussed in the council of state. Bonaparte took a lively part in these first discussions, especially on the question of the institution of the jury, which he strongly opposed on the ground of the probable incapacity or party spirit of jurors: he looked upon the question in a political rather than a judicial light. Portalis, Simeon, Bigot de Préameneu, and Ségur sided with Bonaparte. Treilhard, Berlier, Defermon, Crétet, Bérenger, Merlin, and Louis Bonaparte defended the jury. There is an interesting account of this discussion in Thibaudeau (vol. vii., pp. 88, &c.). The question being put to the vote, the majority was favourable to the jury. The matter, however, was finally settled by suppressing the jury d'accusation, or grand jury, and retaining the jury de jugement. The jurors are taken from the electors, who are qualified to vote for a member of the legislature, graduates in law, medicine, and other sciences, notaries, &c. A list of persons so qualified is made out by the prefect of the department, from which the President of the Cour Royale, or of the Cour d'Assize, selects the number required to serve. The proceedings in criminal trials are partly written and partly oral. The accused is first brought before the procureur du roi (king's attorney), who examines him and simply reports the case to the juge d'instruction, without giving any opinion upon it. At the same time, if the accused is charged with a crime punishable with personal and degrading penalties, he orders his detention. For mere délits or misdemeanors, bail is allowed. The juge d'instruction summons and examines the witnesses, and then sends back the report to the procureur du roi, who makes his remarks on the case, which is then laid before the chambre de conseil, consisting of three judges of the tribunal de première instance. These judges investigate the case minutely, and decide if there is ground for further proceedings. In such case the report is laid before the chambre d'accusation, composed of five judges of the Cour Royale, who ultimately decide for commitment or acquittal. If committed for a crime punishable by peines afflictives or infamantes, the prisoner takes his trial before the next cour d'assise of the department. If for mere délit or misdemeanor, he is sent before the correctional tribunal. The courts of assize consist of a president and three judges, chosen from among the members of the Cour Royale and of the tribunal de première instance, and their sessions are held every three months in the chef lieu of each department. The jury decide by a majority on the fact of the charge; eight constitute a majority. The court then awards the sentence, having a discretion between a maximum and a minimum penalty. By a law passed since 1830 the court can no longer reconsider the verdict of the jury, as was the case before. The prisoner may challenge twelve jurors. One or two juges d'instruction are attached to each court of assize for criminal cases; they are generally taken from among the juges de première instance, and for a definite time only. The Code d'Instruction Criminelle consists of the following books: 1. Of the judiciary police and the various officers whose duty it is to inquire after offences, collect the evidence, and deliver the prisoners to the proper courts. These officers are very numerous, including the maires and their assistants, the commissaries of police, the rural guards and forest-keepers, the justices of the peace, the king's attorneys and their substitutes, the juges d'instruction, &c. It also treats of the manner of proceeding by the king's attorney, as already stated. Of the juge d'instruction and his functions, distinguishing between cases of flagrant crime and others. Book 2 treats of the various courts; tribunaux de simple police, which take cognizance of petty offences, and can inflict imprisonment of not more than five days, and a fine not exceeding fifteen francs; tribunaux en matière correctionnelle, which are composed of at least three judges of the tribunaux de première instance, and take cognizance of délits or misdemeanors, the penalties for which are defined in the Code Pénal; cours d'assise, already mentioned, from which there is an appeal for informality or want of jurisdiction to the Court of Cassation; lastly, the cours spéciales or exceptional courts, which Napoleon insisted upon having at his disposal, and which have been resorted to repeatedly since the Restoration, and still appear on the code. These special courts are assembled in cases of armed rebellion against the authorities, but they also take cognizance of the offence of coining and of crimes committed by vagabonds and convicts who have escaped; they are composed of a president taken from among the judges of the Cour Royale, four judges, and three military officers of the rank of captain or above. They try without jury, judge by majority and without appeal, and the sentence is executed within twenty-four hours. On the subject of the Code d'Instruction, Thibaudeau observes that it retained many of the ameliorations introduced by the National Assembly, especially the publicity of trial and the institution of the jury. Its chief faults are, the great number of officers, some of them merely administrative, who are charged with the pursuit of offenders, by which circumstance the citizens are often exposed to vexatious interference; the too great extent given to the jurisdiction of the correctional courts, by which, in many cases, the citizens are deprived of the guarantee afforded by the jury; the restrictions on the choice of jurors, which is too much in the power of prefects and other local authorities; the institution of the special courts; and, lastly, the frequent abuse of the power of the police, by which its agents could issue warrants of arrest.

'Prefects and commissary-generals of police often had individuals arrested, and left them in prison waiting for the decision of the minister of police, who answered at his leisure, or at times confirmed the order of arrest for an indefinite time. And as by Art. 75 of the Consular Constitution of the year 8, any suit against the agents of government was forbidden without an authorization from the council of state, there was in fact no redress against arbitrary acts.' (*Hist. de France sous Napoléon*, vol. vii. pp. 124—9).

This last abuse is now corrected, or at least greatly mitigated. Other provisions of the Code d'Instruction, as well as of the Penal Code, have been also altered for the better by the law of 28 April, 1832, entitled 'Modifications aux Codes d'Instruction Criminelle et Pénal,' which is found at the end of the later collections of the French codes.

The *Code Pénal*, or laws defining crimes and punishments, was completed in January, 1810. Its discussion occupied forty-one sittings of the council of state. Of these sittings Napoleon attended only one (21 January, 1809). Cambacères presided at all the rest. 'Napoleon was therefore a stranger to its discussions; he only expressed an opinion that the laws ought to be concise, and leave much latitude to the judges and the government in the application

of the penalty, 'because,' said he, 'men had feelings of compassion unknown to the law.' He insisted upon the penalty of confiscation being retained in certain cases, because most nations had sanctioned it in cases of conspiracy, rebellion, and false coining. 'But the definition of crimes and offences, the nature of the penalties, and the mode of their application, were the work of criminal jurists, who were generally inclined to severity, and were well acquainted with the ideas of Napoleon, who was persuaded that criminal legislation ought to be very rigorous in order to maintain order and support the authority of the government.' (Thibaudeau, vol. viii. p. 3.) Hence the penalty of death was fixed in numerous cases, and those of perpetual imprisonment, hard work, or transportation for life, in a still greater number. The pillory is also one of the punishments.

If we look at book iii. ch. 1, which treats of the crimes and offences against the safety of the state (a term susceptible of indefinite and arbitrary application), we find that the penalties of death and confiscation are fixed very generally. Confiscation however has been solemnly abolished by a law passed under Louis XVIII. By the head, 'Des critiques, censures ou provocations contre l'autorité publique dans un discours pastoral,' any clergyman found guilty of having, in a pastoral charge, sermon, or other public address, spoken or printed, criticised or censured any act of the government authorities, is subject to banishment, transportation, and even death, according to the consequences which have resulted from his act. The following head, 'Résistance, désobéissance, et autres manquemens envers l'autorité publique,' is equally severe. The article 'Délits commis par la voie d'écrits, images ou gravures, distribués sans nom de l'auteur, &c.' concerns the press, which was under a strict censorship in Napoleon's time. Since the Restoration the censorship has been abolished, and several laws have been enacted to repress abuses of the press, especially in April and October, 1831. The last law on this subject was promulgated in September, 1835, and consists of five heads: 1. Crimes, délits et contraventions. 2. Du gérant (editor) des journaux ou écrits périodiques. 3. Des desseins, gravures, lithographies, et emblêmes. 4. Des théâtres, et pièces de théâtre. 5. De la poursuite et du jugement. It is printed at the end of a collection of codes, laws, &c., published in 1835, and styled 'Les dix-huit Codes du Royaume.' By the section of the Penal Code entitled 'Des Associations ou Réunions illicites,' which continues in force to this day, every association of more than twenty persons for the purpose of meeting on fixed days to discuss either political, religious, literary, or other subjects, is declared illegal, unless it first obtain the approbation of the government, which can prescribe conditions and fix regulations at its pleasure. The chiefs or directors of any such illegal association are punished by fine. If at the meetings of such assemblies there has been any provocation to crimes or délits, as defined in the other articles of the penal code, the chiefs or directors and administrators are liable to imprisonment from three months to two years, besides fine, although they themselves may not have been guilty of the offence. No individual can lend his house or apartments for the meeting even of an authorized association, unless he first obtain the permission of the municipal authorities. By a law which passed the Chambers in April, 1834, the above regulations have been made even more strict. Every member of an illegal association is liable to a fine of 1000 francs, and to imprisonment from two months to one year. Under the heads 'Vagabondage' and 'Mendicité,' vagrants are defined to be all those who have no fixed domicile, nor means of subsistence, and who do not follow habitually any trade or profession. On the legal evidence of being such, they are condemned to an imprisonment of from three to six months, after which they are 'at the disposal of government.' With regard to mendicants or beggars, any person found begging in a place where there is a workhouse or depôt for the poor is subject to from three to six months' imprisonment. But the next article is much more liable to objection on the score of justice and humanity; it runs thus:—In places and cantons where there is no depôt for the poor (which is the case in most rural districts of France), able-bodied beggars shall be imprisoned for a period of from one to three months; and if arrested out of the canton where they reside, they are imprisoned for a term of from six months to two years. By Article 402, bankrupts not fraudulent are liable to imprisonment from one month to two years. Brokers in the same situation are condemned to hard work for a time. The law of France makes a wide distinction between native and foreign insolvents. Foreigners not domiciled in France, having no commercial establishment or real property there, are liable to double the period of imprisonment that a Frenchman is, namely, two years for a debt less than 500 francs; four years for a higher sum under 1000 francs; six under 3000; eight for less than 5000; and ten years for 5000 and upwards. (Okey, *Concise Digest of the Law, Usage, and Custom affecting the Commercial and Civil Intercourse of the Subjects of Great Britain and France.*) By the head 'Violations des réglemens rélatifs aux manufactures, au commerce, et aux arts,' any coalition between masters to lower wages is punished by a fine of from 200 to 3000 francs, besides imprisonment not exceeding a month. Coalition among workmen, followed by an attempt to stop the works of a manufactory, is punished by imprisonment of from one to three months; the leaders or originators of the coalition or attempt are subject to imprisonment from two to five years. By Article 417, any one who, with the view of injuring French industry, has removed to a foreign country the workmen or clerks of a manufactory, may be imprisoned from six months to two years, besides paying a fine of from 50 to 300 francs. Article 418: Any director, clerk, agent, or workman, of a manufactory, who communicates to foreigners or to Frenchmen residing abroad any secret of the fabric in which he is employed, is punished by a fine of from 500 to 20,000 francs, besides imprisonment at the discretion of the court. Article 421: all wagers or bets upon the rise or fall of the public funds are punishable by imprisonment from one month to one year, besides a fine of from 500 to 10,000 francs. The offenders may after the expiration of their imprisonment be placed by sentence of the court under the surveillance of the haute police from two to five years. This sentence, 'placed under the surveillance of the high or government police,' which is added at the end of numerous penalties, means that the person so placed is to give security for his good conduct; in default of which he is 'at the disposal of government,' who may fix a particular place for his residence. All individuals who have undergone the punishment of hard work for a time, or that of banishment or transportation, or those who have suffered a penalty for political crimes, are placed, *de jure*, under the surveillance of the high police for the rest of their lives.

The above extracts are sufficient to show the spirit in which the French criminal code has been framed. It is, in fact, as harsh and illiberal in many of its enactments as that of any absolute government in Europe. In speaking therefore of Napoleon's legislation, it is necessary to discriminate between the civil and the criminal laws; and again between the laws themselves and the practice and rules of proceeding in the courts. The adoption of the French criminal code met with great opposition in Italy. At Milan the legislative body attempted to modify and adapt it to the habits and wants of the Italians. Two commissions were appointed by the minister of justice, one for the code of instruction, and the other for the code pénal. Their reports were sent to Paris, but were rejected by Napoleon, and an answer came with peremptory orders to translate literally, and enforce the two French codes without any alteration. At Naples similar objections were also made, but with no better effect. (Colletta, *Storia del Reame di Napoli*, book vi.)

For comments and strictures by French jurists on the criminal laws of France, see Bérenger *de la Justice Criminelle en France*, 1818; Dupin, *Observations sur plusieurs points importans de notre Législation Criminelle*; and Bavoux, *Leçons préliminaires sur le Code Pénal*, 1821.

There are in France more than 3000 judges, including those of the commercial courts, besides 2840 juges de paix. The judges of the Tribunaux de Première Instance have salaries varying from 2000 to 6000 francs; those of the Cours Royales, from 3000 to 8000. The presidents and vice-presidents receive more in proportion. The juges de paix receive about 800 francs, besides certain fees. The various courts, magistrates, greffiers, &c., cost the state about fifteen millions of francs annually. (Goldsmith, *Statistics of France*, 1832.)

For a general view of the judiciary system of France, see Meyer, *Esprit des Institutions Judiciaires*, last vol.; and Rey, *des Institutions Judiciaires de l'Angleterre, comparées avec celles de France et de quelques autres États*, 1826

CODICIL, in English law. [WILL.]

CODICILLUS, the diminutive of Codex, signifies properly something written on a little wooden tablet. Cicero (*ad Fam.* iv. 12, vi. 18; *ad Attic.* xii. 8; *ad Quint. Fratr.* ii. 10) often uses Codicilli for epistolæ, or letters. Codicilli, in fact, were letters addressed by a testator to the heir or heirs named in his will, as to certain things which the testator wished to be done by his heir or heirs after his decease. (Heinecc. *Antiq.* ii., tit. xxiii and xxv., section xi.)

The difficulty which existed, out of Rome, of procuring the legal number of Roman citizens as witnesses to a solemn will, led to the use of Codicils. It appears from Justinian's 'Institutes' (*de Codic.* ii., 25) that codicils came into use in the time of the Emperor Augustus. Lucius Lentulus, who died in Africa, had addressed a codicil (that is, a letter) to Augustus, his testamentary heir, who complied with the wish of Lentulus, though he was under no obligation to do so. From that time codicils became legal instruments.

The Codicillus has been defined to be a supplement or addition to a testament, which is to be considered as annexed to the will itself, for the purpose of adding, explaining, or altering something in the previous disposition. But such a definition does not give an exact notion of the term, and besides this, it applies only to the cases where the person making the codicil dies testate; consequently it does not take in those cases where no will exists. More correctly, codicil is defined to be a less solemn will, in which, as well as in a solemn will or testament, every disposition that can be effected by a last will may be made, except the appointment of direct heirs, and exheredation, *i.e.*, the disinheriting of sons, daughters, &c. Codicils were commonly used for the purpose of naming bequests or legacies to be paid by the heirs already appointed by a testament, and for explaining and clearing up obscurities and want of precision in a testament.

There are two species of Roman Codicils: *ab intestato*, when a man who made a codicil died intestate; and *codicilli ad testamentum facti*, when he died testate. In the former case the dispositions in the codicil had reference to the heres ab intestato, or the person to whom the law gave the intestate's property. Codicils of the second species were either confirmed by the testament (codicilli confirmati) or not (non confirmati). Before Justinian's time there were several differences between these two sorts of codicils, particularly as to legata and fidei commissa; but the different species of bequests being put on the same footing in the reign of Justinian, the distinctions ceased. In the time of Pliny the Younger, a codicil made before a subsequent will ought to be confirmed by the will (lib. ii. ep. 16); but this was afterwards dispensed with (*Instit.* ii. 26). Sometimes future codicils were confirmed by a prospective will.

Codicils might be written, in which case they were either public or private; or they might be verbal directions given to the heir. In their origin codicils had no particular forms, but the Emperor Constantine required witnesses to codicilli ab intestato, and to codicilli non confirmati; and Justinian required witnesses for all private codicilli.

A testament wanting the legal forms required for such a solemn instrument might be maintained as a codicil if the legal forms for a codicil were observed, and the will contained the codicil-clause (clausula codicillaris). (See Brissonius *De Formul.* lib. viii.; Gaius, lib. ii., Dig. 29, Tit. 7; *De Jure Codicillorum.*)

CODIFICATION. [LAW and LEGISLATION.]

CODRUS (Κόδρος), son of Melanthus, and the last king of Athens, as to whom the following tradition is preserved. When some of the Dorian states had united their forces for the invasion of Attica, they consulted the Delphic oracle concerning the issue of the expedition. The response implied that they would be victorious if the life of the Athenian king was spared. The Athenians being informed of this answer of the oracle by Cleomantis, an inhabitant of Delphi, Codrus heroically determined to devote himself for his country. Accordingly he went out at the gate disguised in a peasant's dress, and falling in with two Dorians, killed one with his hook, and was himself killed by the other. The Athenians demanded and got back the body of their king; and the Dorians, despairing of success, withdrew their forces. The exact spot where Codrus was said to have fallen was shown in the time of Pausanias (i., 19), near the altar of the Muses, on the Ilissus. Codrus had several sons · the two eldest were Medon and Nileus. Cleomantis and his descendants were rewarded with the freedom of the city, and a perpetual right to sit at the public table, which was kept in the Prytaneum at Athens. (*Lycurgus against Leocrates*, sections 194 and 196; Pausanias, vii., 225.)

CO-EFFICIENT (in Algebra). When two or more numbers are multiplied together, each of them is called a factor of the product, and a co-efficient (or co-factor, as it were) of the other factors. Thus the factors of the product $a \times b \times c$ are a, b, and c; and a is the coefficient of $b \times c$, b of $a \times c$, and c of $a \times b$. But the word is most frequently used for that which should be distinguished as a numerical coefficient; thus in $2x + 3y$, 2 and 3 are respectively the coefficients of x and y. This word is as old at least as the writings of Vieta, in which it has its present sense.

When there is a multiplier depending upon the result of experiment connected with any particular property of matter, the number is frequently called the coefficient of that property. Thus by the coefficient of friction for any substance, is meant the fraction of the pressure which is equivalent to the friction of that substance.

COEHORN, MENNON, BARON DE, a celebrated Dutch engineer, who was born in 1632. He commenced his military career at an early age, and spent the leisure which the intervals of active duty afforded in improving the art of fortifying places, with the view of diminishing the inequality which, by the inventions of his contemporary Vauban, began then to be felt in the means of attack and defence. The services which Coehorn rendered to his country, both as an engineer and a commander, at a time when the defence of its military posts was an object of the first importance, procured for him the most honourable appointments which a soldier can attain. He arrived at the rank of general of artillery, and was made director-general of fortifications and governor of Flanders.

At the siege of Namur in 1692, Coehorn gallantly defended the fort which he had before constructed for the purpose of strengthening the citadel of that place, but being dangerously wounded he was at length compelled to surrender. It is honourable to the character of Vauban, who conducted the operations of the attack, that on this occasion he rendered full justice to the talents and valour of his rival.

Coehorn was engaged at the attack of Trarbach, Limburg, Liege, and at that of the citadel of Namur, which three years before he had defended. In the year 1703 he was employed at the siege of Bonn, where, in three days, his heavy and well-directed cannonade caused the surrender of the place. Soon afterwards he forced the French lines at Hanuye, and was appointed with his army to keep in check the Marquis de Bedmar on the right bank of the Scheldt. This was his last service: in the following year (1704) he died at the Hague, at the age of seventy-two.

In 1685 Coehorn published what are called his Three Systems of Fortification; they are adapted to ground elevated but from three to five feet above the surface of water, and consequently they may be considered as applicable only to the towns of Holland. He was appointed to repair or reconstruct the fortifications of Nimeguen, Breda, Mannheim (since destroyed), and Bergen-op-Zoom. The siege of the last place in 1747, by its duration and the losses which the besiegers sustained in its progress, attests the merit of the system on which the works were constructed.

COEHORN, a small mortar for throwing grenades, invented by the engineer of that name.

CŒLINO. [ISOPODA.]

CŒLIUS, or rather CÆLIUS ANTIPATER (LUCIUS), wrote a history of the second Punic war, in a work bearing the name of 'Annals,' and extending to at least seven books. Some indeed are of opinion that the history embraced a much wider period, beginning with the first Punic war, and including the times of the Gracci. It was dedicated to L. Ælius, the same person to whom the poet Lucilius dedicated his 'Satires.' The precise period of his birth or death cannot be fixed, but he is called by Cicero (*De Leg.* i., 2) the contemporary of C. Fannius Strabo, himself an historian, and we know that Fannius was with Scipio at Carthage, in 146 B.C., and Consul in 122. That Cælius lived about this period is confirmed incidentally by an anecdote reported by Cicero (*De Divinat.* i., 26). When Caius Graccus was a candidate for the quæstorship, his

brother Tiberius appeared to him in a dream, and warned him that he would perish by the same violent fate which had befallen himself. And Cælius tells us, says Cicero, that he both heard of this dream and spoke of it to others before Caius Gracous was elected tribune, and consequently several years before it was fulfilled. Now the death of Tiberius Graccus occurred in 133. His brother Caius was quæstor in 126, tribune for the first time in 123, and murdered in 121. Lastly, the orator, L. Crassus, born 140, was one among many pupils of Cælius. We shall therefore not be very wrong if we suppose Cælius to have been born about the middle of the second century B. C.

The historical writings of Cælius were highly valued by his countrymen in the time of Cicero, who assigns to him the credit of having surpassed his predecessors in historic composition by the dignity and eloquence of his style. Though he wanted that knowledge of the jurisprudence of his country which is essential to an accurate historian, yet he was a man of an inquisitive temper, and seems generally to have the advantage in point of credibility where he differs from the historians of the same period. Marcus Brutus so highly prized his writings, that he made an epitome or abridgment of them, as he had before done of the histories composed by Polybius and Fannius. But the more complete work of Livy threw all the historical works of his predecessors into oblivion. Cælius was afterwards seldom read, except by antiquarians and those who sought in his writings examples of quaint words and obsolete phraseology; it is to the grammarians therefore that we are chiefly indebted for the fragments of his works that still exist. These fragments, together with those of other Roman historians, may be found in an appendix to Cort's and Havercamp's editions of Sallust. They have also been edited by Krause (*Vitæ et Fragmenta Veterum Historicorum Romanorum*, Berol., 1833). One of the most interesting among them is that in which he bears testimony to having seen a merchant who had sailed from Spain as far as Ethiopia, by which he probably meant the Coast of Guinea. It is Cælius too who gives the most direct evidence in favour of Hannibal's route across the Alps having been by the Little St. Bernard.

The Greek name Antipater, attached as a cognomen to that of Cælius, has with some reason led to the belief that he or his father was of Greek origin, and becoming a Roman prisoner and slave by the chance of war, was afterwards emancipated, and then took, as was the custom, the name of his Roman master. Such an origin is confirmed by the fact, that the name of one so distinguished by his talents, and especially his eloquence, is nowhere mentioned in connection with any public appointment. Two copious dissertations on L. Cælius, by B. A. Nauta and W. G. Van Prinsterer, will be found in the Annals of the Academy of Leyden for 1821. (See *Krause* as above.)

CŒLIUS, MONS. [ROME.]

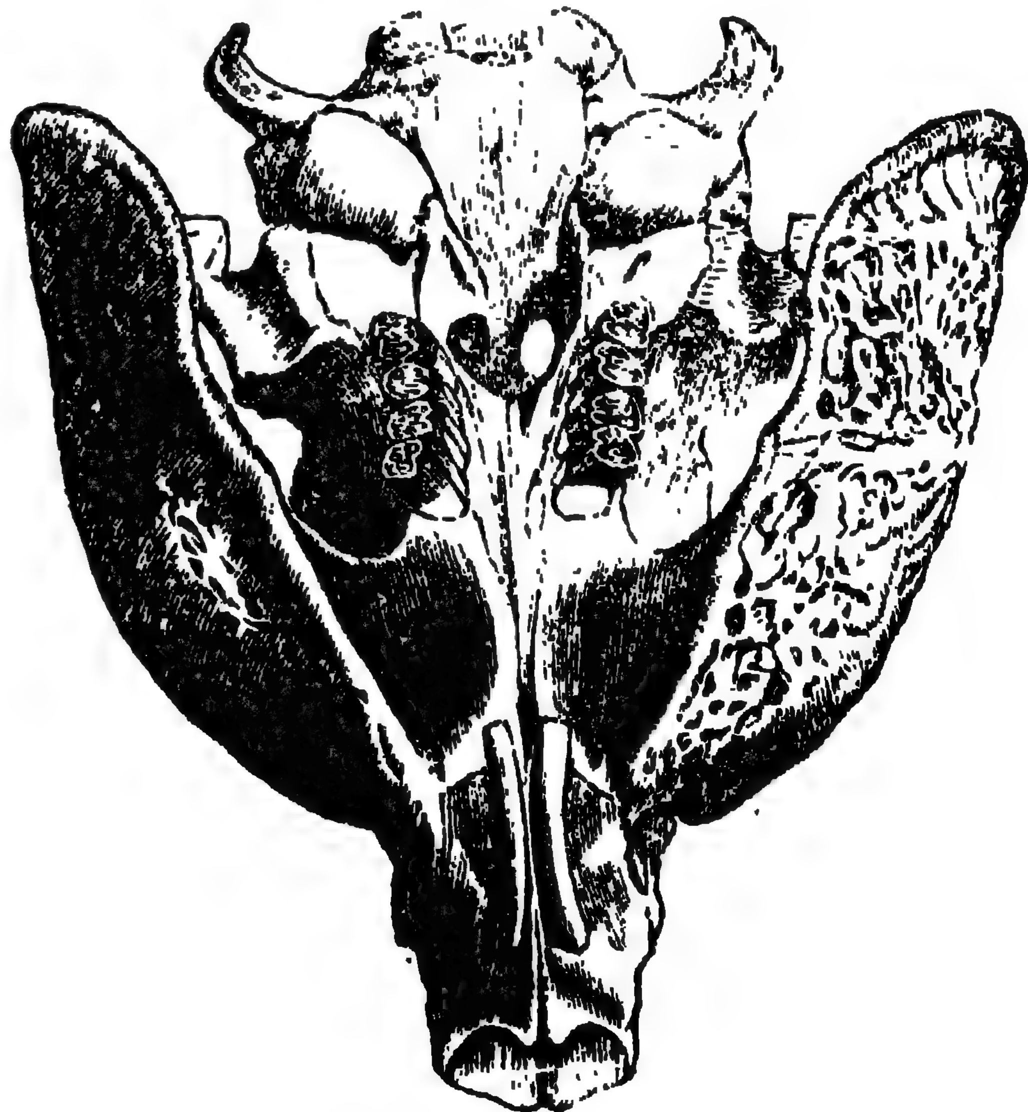
CŒLO'GENUS (F. Cuvier), *Cœlogenys* (Illiger), a genus of Rodent animals, belonging to the division without clavicles. Its place among the older naturalists was either among the Rats (*Mus*) or among the Hares. Linnæus, in his last edition (the 12th), arranges it under his extensive genus *Mus*, with the denomination of *Mus Paca*, and quotes, among others, Ray, who termed it *Mus Brasiliensis*. Klein separated the Cavy, Agouti, and the animal before us from the mass, under the generic appellation of *Cavia*. Gmelin, in his edition of Linnæus (the 13th), followed Klein, and added to the Cavies and Agoutis the Capybara, which Pallas, in his 'Spicilegia,' had termed *Cavia Capybara**, and Linnæus had placed among the Hogs (*Sus*). M. F. Cuvier separated the Paca from the Capybara, the Cavies, and the Agoutis, to which forms it shows a strong approximation, but from which it also presents considerable differences in many points, and especially in the complex structure of the molar teeth.

Dentition, &c.—Two strong incisor teeth in each jaw, the upper ones flattened in front and truncated obliquely, chisel-like; the lower slightly compressed laterally, and rounded on the anterior face. But these incisors, though of some strength, are small when compared to those of the porcupines and of the beaver. Like all the true Rodents, *Cœlogenus* has no canines, and a void space or bar separates the incisors from the molars, which amount to eight in each jaw, and are not unlike those of the Agouti, that is to say they are composed of complicated riband-like plates of enamel set in the interior bony cement, which vary and become more or less visible according to the greater or less attrition which the crowns have undergone. But, in *Cœlogenus*, besides the difference in the complications, the molars augment in size from the first to the last, which is one-third larger than the tooth that precedes it. (F. Cuvier.) There is also a striking peculiarity in the great development and projection of the zygomatic arches, which are enormously large, giving great breadth to the face, and descending unusually low. These were remarked by Daubenton; and Buffon observed that, on each side and towards the lower part of the upper jaw, there existed a sort of longitudinal fold, destitute of hair in the middle, so that, at first sight, it might be mistaken for the mouth of the animal. This fold, which Buffon does not seem to have investigated, is the opening of a shut sac of some extent, extending upwards behind the arch formed by the cheek and temporal bones, whose inner surface, as far as the sac extends within them, is lined by a continuation of the integument of the face, and, in addition to it, the animal is furnished with true cheek-pouches in their usual situation. These last are capable of being greatly dilated, and when filled, they are said to occupy the whole space beneath the zygomatic arches.

Dental formula: incisors, $\frac{2}{2}$; molars, $\frac{4}{4} = 20$



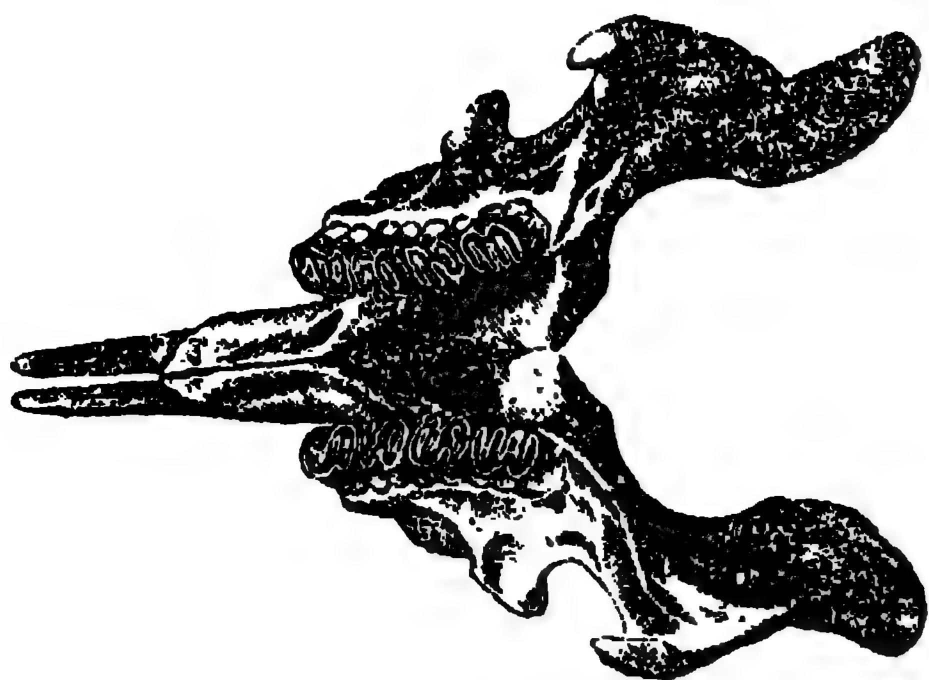
[Skull of Cœlogenus.]



[Upper jaw of the same.]

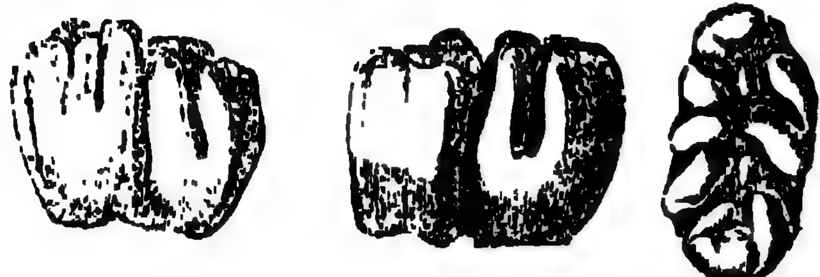
M. F. Cuvier observes that the Pacas are, among the Omnivorous Rodents, what the Capybaras are among the Herbivorous section. The first possess molars with roots distinct from their crowns, to the number of four on each side of either jaw. Those of the upper jaw are nearly of a size; but, in the lower, they diminish gradually from the last to

* N.B. There was a reference to Capybara from Cabiäi. The reader will find that animal, whose history was omitted under the title referred to, described in the article HYDROCHŒRUS.



[Under jaw of the same.]

the first. All the molars, before they have been subjected to the process of mastication, present, on the upper surface



Germ of the first molar, enlarged. View of the outside, inside, and crown.—(F. Cuvier.)

of the crown, four tubercles, which more or less completely divide the tooth broadwise, and are separated by three transverse furrows, more or less large or deep. When the crown of the tooth is exposed to mastication, the top of the tubercles begins to wear away, and the enamel, instead of forming a sort of hood or cap, presents a series of riband-like foldings, the outlines of which are conformable to the tubercles and furrows. In proportion to the continuance of the abrasion, the tubercles are successively effaced; and, finally, nothing is to be seen but the enamel, which hoops the tooth externally, and that which penetrates the interior and is there complicated, the plaits going very deep, so that the ribands of enamel, whose edges are exposed on the triturating surface, change their appearance with the age of the animal, and terminate by disappearing in great measure.

Approximations.—The Pacas approach the Capybaras and the Agoutis most nearly, and are closely allied to the latter by their general form and the similarity of their organization. The dental and generative systems in both are very nearly alike: neither have clavicles, nor indeed has the Capybara; and though the Agouti has only three toes on the hind feet, the two additional hind toes of the Paca are hardly more than rudiments. The great differences consist in the zygomatic development, the folding back of the skin under the zygomatic arch—and the consequent bluff appearance of the head—the cheek-pouches, and the fur.

Species.—M. F. Cuvier records two species, viz., *Cœlogenus subniger* and *Cœlogenus fulvus;* but Baron Cuvier, in the last edition of the 'Règne Animal,' treats them as varieties of the same species; and he adds in a note, that Dr. Harlan ('Fauna Americ.' p. 126) has founded, on a head preserved in the Philadelphia Museum, a new genus under the name of *Osteopera*, but that it appears to him (Cuvier) that the description is only that of the Paca; and he concludes by stating that M. Desmarest had already made the same observation.

Example, *Cœlogenus subniger.*—Its general appearance reminds the observer of the Pachydermatous animals, for it is thick-set and stubby. The legs are thick, the neck short, the head heavy, the body rounded, the gait clumsy, but the motions of the animal are prompt and sudden. All the feet have five toes, which, anteriorly, have the ordinary proportions, but, posteriorly, the analogues of the little toe and great toe are extremely short in proportion to the rest, and almost rudimentary, like the upper or lateral toes in the hog. The claws are conical, thick, and strong, and proper for digging. The tail is reduced to a naked, immovable tubercle, a few lines in length. The principal male organ is directed backwards, and there is no external appearance of the testicles. The external ear is moderate in size, rounded, and simple. There is nothing particular about the eye, the pupil of which is round. The nostrils, which are large and almost united, open transversely at the muzzle. The tongue is very soft, short, and thick. The upper lip is divided, the interior of the mouth is furnished with cheek-pouches, and, externally, the large area formed by the development of the zygomatic arch is lined on its inner surface with a continuation of the skin of the cheeks, which is reflected from the face, so as to form a hollow pouch, of which there is no other example among mammiferous animals, and the use of which it is difficult to divine, if the great development of the zygomatic arch be not destined to preserve the true cheek-pouches (abajoues) from external shocks. Strong whiskers spring from the sides of the muzzle, and from behind the eye. The fur is composed of silky hairs, very short, very thin, and very stiff, of a blackish-brown on all the upper parts of the body, excepting four rows of parallel spots, which begin at the shoulders and terminate at the buttocks: the spots of each row are so approximated, that when viewed in a particular direction they seem to form an uninterrupted line, and the row nearest the belly is almost confounded with the colour of that part, which is white, as well as the under parts of the lower jaws, the internal surface of the limbs and the claws. Length of the body, from the occiput to the insertion of the tail, sixteen inches: length of the head, from the occiput to the end of the muzzle, five inches. Height, to the shoulders twelve inches—to the top of the buttocks (train de derrière) fourteen inches, French. (F. Cuvier.)

Geographical Distribution.—This animal is better known as the Paca of zoologists generally, and, after the Capybara and Coypu, is one of the largest of the South American Rodents. It is the Spotted Cavy of Pennant and Bewick, the *Pag* of the Brazilians, *Paig* of the inhabitants of Paraguay, *Ourana* of some of the tribes of Guiana and *Pakiri* of others, the *Pak* of the colonists of Cayenne, and the *Water Hare* of those of Surinam. In all these countries it is common, with the exception of Paraguay, where, according to D'Azara, it is very rare. They formerly existed in the islands of the West Indies.

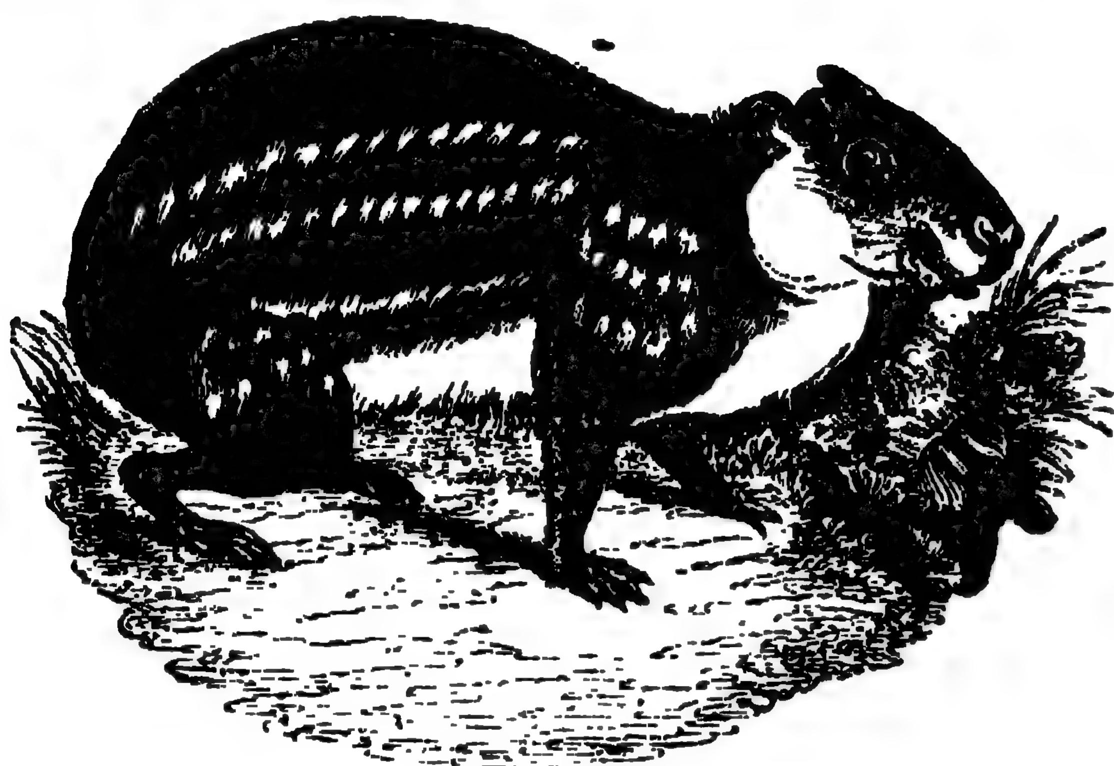
Habits.—In a state of nature the habitation of the Paca is in low humid forests, and in the neighbourhood of water. The animal digs a burrow like the rabbit, but much less deep; indeed it is so near the surface, that the foot of the pedestrian often breaks through, and, sinking into the tunnel, drives out the tenant. There are generally three issues to a burrow, and the aperture of these the animal covers with dry leaves and branches. To take it alive, the hunter stops two of these apertures, and digs into the third; but when the penetralia are reached, the hapless besieged makes a most determined resistance, fighting the enemy with ferocity, and trying to bite. When undisturbed, it often sits up and washes its head and whiskers with its two fore-paws, which it licks and moistens with its saliva at each ablution, like a cat; and with these fore paws, as well as with the hind ones, it often scratches itself and dresses its fur. Though heavy and corpulent, it can run with a good deal of activity, and often takes lively jumps. It swims and dives with great adroitness, and its cry resembles the grunting of a young pig. Its food consists of fruits and tender plants, which it seeks in the night, hardly ever quitting its burrow in the day, the strong light of which, as is the case with other nocturnal animals, is oppressive to its eye: the planter often rues the visits made by these midnight foragers to his sugar-canes. The female is said to bring forth at the rainy season, and to produce but a single young one, which stays a long time with the mother. The Pacas are very cleanly creatures, never dropping their excrements near their dwellings, but going to a considerable distance for that purpose.

In captivity, according to M. F. Cuvier, no animal can exhibit less intelligence. When offended, it throws itself violently at the object which has displeased it, and then makes a grumbling, which breaks out into a kind of barking; and when it is not eating it is sleeping. But it requires a soft and well-made bed; and, to obtain this, it collects with its mouth hay, herbage, straw, anything indeed that suits its purpose, of which it makes a little heap, and then lies down in the centre of it. This bed it never defiles, but goes to the extremity of its cage the farthest removed from it, and constantly resorts to the same spot for the same purpose. If, says M. F. Cuvier, it is but little favoured on the side of intelligence, it appears on the other hand to be recompensed by a large share of instinct, to judge, at least, by appearances. Mr. Bennett, from his observation of one which lived for some months in the garden of the Zoological Society in the Regent's Park, says that it is quiet and contented in captivity. Buffon, who kept one for some time in his house, found it familiar and mild. He gives a de-

tailed account of its manners and mode of life in the 10th vol. of his works, to which we refer the reader.

The Paca has been long known. Marcgrave, Piso, John de Laet, Maffé, Jean de Lery, D'Azara, and Barère all mention it. Jean de Laet describes it in two different places (pp. 551, 618) under the names of *Pag*, or *Pague*, and *Pac*. Marcgrave gave a very bad figure of it, Piso followed, and Jonston copied Piso. Buffon gave a much better representation, copied by Schreber. Bowick's is not without character; and the figures given by M. F. Cuvier (*Histoire Naturelle des Mammifères*, tome 3) and by Mr. Bennett (*Gardens and Menagerie of the Zool. Soc.*, vol. i.) are very good.

Utility to Man.—The flesh is stated to be excellent and of good flavour; but as it is very fat and rich, it soon cloys: it is prepared for cookery by being scalded like a sucking pig. Piso gives the following character of its merits for the table:—'Carne est tenera, pingui lardo non indigens, si assetur, sed inter epulas magnatum, sicut lepores et capreæ in Europâ, habetur.' Its skin is of no value to the furrier; but its thickness might make it available in the useful arts. M. F. Cuvier thinks that it would be possible to introduce this animal into our European rural establishments, and that it would form a very good acquisition in the department of domestic economy



[Cœlogenus subniger.]

CŒLOPTYCHIUM. [ZOOPHYTARIA.]

COEMPTIO. [MARRIAGE.]

CŒNOBITES. [CONVENT.]

CŒREBA. [NECTARINIDÆ.]

COETHEN, or KOETHEN. The duchy of Anhalt Cöthen (or Köthen), in the territory of Anhalt, is bounded by the dominions of Prussia, Dessau, and Bernburg. It consists of four detached districts: Cöthen Proper, the bailiwick of Warmsdorf, Lindau, and Dornburg. Cöthen Proper is skirted on the north by the Fuhne, and on the east by the Saale. The whole comprise 310 square miles, and contain 4 towns, 1 market-town, 94 villages, and about 6000 houses. The duchy altogether is a level, with the exception of occasional and in considerable eminences. The whole surface is covered with rich corn-fields and meadows, whose fertility is proverbial. Nearly all the roads are planted with fruit-trees. The climate is mild. Besides the Mulde, Eine, and Selke, the duchy is watered by the Elbe, Saale, Wipper, Liethe, Bude, and other streams. A considerable fishery is carried on in the Saale, Bude, and Elbe. The chief products are rye, barley, wheat, buckwheat, vegetables and fruits, hops, potatoes, rapeseed, oil, flax, &c. On the left bank of the Elbe are quarries of lime and gypsum. The inhabitants are chiefly engaged in agriculture and the rearing of cattle, especially oxen and sheep; they are also employed in the manufacture of oil, yarn, linen, wool, and leather, but in very inconsiderable quantities. The population in 1831 was 36,000, of whom two-thirds are employed in agriculture. Of the forty-eight parishes, twenty-eight belong to the Reformed Lutheran, nineteen to the Lutheran, and one to the Roman Catholic church. The principal places of trade, besides Coethen, are Nienburg, at the confluence of the Saale and Bode (about 1900 inhabitants), St. Güsten on the Wipper (about 1640), and Rosslau on the Elbe (about 1400). The income of the duchy is about 320,000 guilders, or 30,700*l.* sterling, exclusive of the duke's large patrimonial revenues. The public debt is about 115,000*l.* The duke has also extensive private property in the Russian province of Taurica, called Ascania Nova, amounting to about 134,000 acres, chiefly pasture ground, on which above 22,000 Merino sheep are fed. It was purchased by him in 1828. The permanent military force of Coethen consists of 329 men. The duchy is under the protection of Prussia.

COETHEN, the capital, lies in a fertile but low situation, at a short distance from the river Zittau, nearly in the centre of the duchy, between the Elbe, Fuhne, Saale, and Mulde, in 51° 45′ N. lat., and 12° 3′ E. long. It was founded by the Sclavonians, and is conjectured to be the Kietni, Kieta, or Gietana, a chief town of the Gietanes: it was devastated in 927 by Henry I. The streets are broad and well paved, and the town upon the whole presents a neat and pleasing appearance. It is the duke's residence, is about half a league in circumference, and surrounded with high walls. It is divided into the old and new town, and the chief buildings are the palace and castle, town-hall, and one Reformed, one Lutheran, and one Roman Catholic church. It also possesses various charitable institutions, particularly an excellent school for the indigent, in an old Carmelite monastery; a grammar and a normal school, a public library and museum of natural history, picture gallery, Bible society, &c. The number of houses is 784, and of inhabitants about 6050; two-thirds of them are Lutherans, and the remainder of the Reformed church.

COFFE'A, a Cinchonaceous genus, consisting of many species of tropical berry-bearing shrubs, one of which, Coffea Arabica, is celebrated for the agreeable stimulating effect of an infusion of its roasted albumen. This substance, the coffee of commerce, is to that plant what the flour is to corn, the white meat to a cocoa-nut, and the aromatic ruminated substance to a nutmeg. It is a secretion formed in the interior of the seed, and enveloping the embryo plant, for whose support it is destined when it first begins to germinate; it constitutes the principal part of the seed, the embryo itself being a minute body lying in a cavity at one end of the albumen. Unskilful observers are often unable to find the embryo: but it may readily be seen by the following simple means:—Take a new sample of small fine unroasted Mocha coffee, and throw it into boiling water; the embryo will, after a little while, be expelled with force from the albumen in a majority of cases.

The genus Coffea is known among Cinchonaceous plants by having a tubular corolla, with four or five spreading divisions; stamens arising from the naked throat of the corolla, and either extending beyond it or inclosed within it; and a succulent berry containing two cells lined with a cartilaginous membrane, of the texture of parchment, in each of which cells there is a single seed, convex at the back and deeply furrowed in front, in consequence of the albumen being rolled inwards.

Coffea Arabica is an ever-green shrub, with oval shining wavy sharp-pointed leaves, white fragrant five-cleft clustered corollas with projecting anthers, and oblong pulpy berries, which are at first of a bright red, but afterwards become purple. It is stated by Niebuhr to have been brought from Abyssinia to Yemen by the Arabs from a country similar to their own plains and mountains. By that people it has for ages been cultivated in the hilly range of Jabal, in a healthy temperate climate, watered by frequent rains, and abounding in wells and water-tanks. Here the plants are grown in grounds that are continually irrigated, and in soil from 1 to 1½ foot deep. Among the plantations are interspersed various kinds of trees, whose shade has a beneficial effect upon the coffee bushes. When in flower, they diffuse a most delicious harmless fragrance, in the midst of which the natives fix their habitations. The fruit begins to ripen in February; and when the seeds are prepared, they are conveyed to the city of *Beit el fakih*, whence part goes to Mocha, and another portion to Hodeida and Loheia, whence it finds its way to Djedda and Suez for the Turkish and European markets.

The climate of the Jabal hills is described by Niebuhr as rainy every day from the beginning of June to the end of September, and the quantity of wet is stated to be so great as not only to fill the Wadies, but to soak the earth both of the lowlands and the hills so much as to keep water throughout the year in the rivers Zebid and Suradj. This enables the cultivator to provide abundant irrigation for his coffee plantations during the dry season, while that object is further facilitated by the terrace plan of cultivation. Scarcely anything further is known of the climate in which the fine Arabian coffee is procured, unless we add the meagre

statements of Forskähl as to the temperature of two or three coffee districts

Beit el fakih	Mar. 16,	7 A.M., 76° Fahr.;	1 P.M., 95°;	10 P.M., 81°
	" 18,	" 77°	" 95°;	" 81°
Hadie	" 18,	" 72°	" 92½°;	" 78°
Bulgosa, a coffee village, 1½ hour's journey into the hills	" 20,	" 69½°	" 85½°;	" 73°

and that the summit of the mountain-ridge of Jabal is so high as to be commonly enveloped in clouds, while the valleys below are lying beneath a pure and cloudless sky.

We have been thus particular about the circumstances under which coffee is grown in its greatest state of excellence, because of its importance as an article of consumption, and because of the inferior quality of all the samples that dother countries have as yet been able to produce.

Richness of soil in the West Indies has been thought to be the cause of the inferior quality of coffee grown in that part of the world, and to the supposed dryness of Yemen has been ascribed the excellence of Mocha coffee. But it has been shown that the Arabs counteract the effect of any dryness in the air by abundant irrigation; and that moreover it is not in the Tehama or dry parts of the country that it is cultivated, but on hill-sides, where the temperature is much lower, and where it rains daily for four months in the year. What is most essential to attend to in all speculations concerning the cultivation of the plant with a hope of equalling its quality in Arabia, is to select a climate where the heat of tropical plains is counteracted by elevation in the air; where during the dry season water can always be commanded in abundance, and where most especially the air is pure and cloudless, so that there may be no loss of light by the intervention of a cloudy sky. Light would seem, from Forskähl's account—short as it is—to be poured upon the coffee country in an uninterrupted flood: and the excessive stimulus thus communicated to all the functions of vegetation, which under other circumstances would probably prove deleterious, is, by an excellent system of irrigation, and the natural dampness of the soil, not only counteracted, but made the cause of the perfect elaboration of those delicate and subtle principles upon which the aroma and active qualities of coffee and all other plants are so entirely dependent. In this and similar considerations it is always to be borne in mind that it is not temperature, nor atmospheric pressure, nor humidity, whether of air or soil, nor light, that by themselves constitute the conditions under which alone plants arrive at their most perfect state, but the peculiar combination of these influences; a combination which varies from country to country, and may in some cases be actually confined within such very narrow natural limits as not to be exactly paralleled elsewhere, although in the majority of instances it may be readily matched in similar latitudes.



[Coffea Arabica.]

a, Corolla opened, showing the stamens; b, pistil; c, berry; d, e, sections of the same; f, embryo.

The seed of *Coffea Arabica* consists of much horny albumen, and a peculiar principle or alkaloid, termed *cafeine*, [CAFEINE], which contains more nitrogen than any other known vegetable substance. The seed is used in a raw state in medicine; but when roasted, both as a medicine and still more extensively as an article of diet. The coffee-plant begins to produce fruit when two or two and a half years old; but the quality of the seeds from young stems is not so good as that from stems four or five years old. The size and colour of the bean (as the inner part of the seed is called) vary considerably, those from the West Indies being larger than those from the East. Much more depends upon the manner of roasting and making the coffee, than upon the quality of the bean. The superiority of French coffee, in the preparation of which little or no Mocha coffee is used, proves this position. Beans of a good quality are hard and heavy, sink quickly in water, are of a light yellowish green colour, not discoloured or black, and possess the odour of coffee, which though faint is peculiar, and are free from any damp smell. Beans recently collected, or only two or three months from the tree, are not so good as those about a year old; when older than this they become deteriorated. From the analysis of Seguin and Schrader, coffee consists of coffee-bitter (impure caffein), solid fat, resin, a little aromatic principle, gum, albumen (this albumen, according to Seguin, unites with the yellow coffee-bitter, and forms a green), and lignin. The taste of raw coffee is somewhat sweetish; but the application of heat in the process of roasting produces important changes. The bean increases to nearly twice the original size, while it loses about a third of its weight: a powerful and agreeable odour is evolved, and a large quantity of empyreumatic oil, which appears in small drops on the surface, is formed along with a bitter principle, probably by an alteration in the caffein, and of the saccharine matter. The roasting should take place in a close revolving iron cylinder, over a clear but moderate fire, and should not be carried too far: when the beans have acquired a light chestnut colour, the roasting should be discontinued. The beans are then to be cooled quickly by being tossed up into the air, and the grinding, or rather rough pounding, should be performed in a covered mortar or mill. The drink should be prepared from it as soon as possible, by infusion, which is preferable, unless some apparatus be employed by which a kind of decoction is made in a close vessel, such as Parker's steam-fountain coffee-pot. About half an ounce of coffee powder should be used for every eight ounces (half a pint) of water. In Britain the roasting is generally carried too far; and the subsequent parts of the process, instead of being performed immediately, are often postponed for days or even weeks, by which the aroma is dissipated: when made, the liquid is generally deficient in strength and clearness. The employment of white of egg or fish-skin to clarify is decidedly objectionable: clearness is thus purchased, but at the expense of the strength.

The addition of milk (which should always be hot) and of sugar heighten the nourishing qualities of this beverage, and in the morning render it a more substantial article for breakfast. When taken after dinner to promote digestion it should be without milk, and, where the palate can be reconciled to it, without sugar.

The action of coffee on the human system is due chiefly to the empyreumatic oil, and consequently is greatest when roasted; but its extractive and also highly nitrogenous principle must exert considerable influence upon the organs of digestion.

Coffee acts powerfully and peculiarly on the ganglionic system of nerves and their ramifications, and all the organs which are supplied by them. It elevates the vitality of these nerves, and quickens all their actions. The brain is likewise markedly acted upon by it; and hence the increased sensibility and greater energy of that organ during the use of coffee, and the removal of all sense of fatigue or disposition to sleep. Upon this depends, in addition to its

local influence upon the organs of digestion, the utility of coffee in counteracting the effects of narcotic poisons, such as opium or belladonna, and the favour it has found among literary persons from enabling them to carry on their studies through the midnight hour without feeling oppressed by sleepiness. It greatly promotes digestion if taken after dinner, and also checks the disturbance of the nervous system arising from the too free use of wine. It excites the vascular system, and renders more powerful the contractions of all the muscles, both voluntary and involuntary. It fits the system therefore to resist the influences of cold and damp, and is proper for night travellers and the inhabitants of humid climates, such as Holland. In warm climates it removes the languor which oppresses those who are exposed to the excessive heat, and helps the stomach to perform its office.

It is not without its counterbalancing disadvantages. For plethoric persons, and those who have a tendency to abdominal congestions, it is unsuited; and for persons subject to piles it is in general improper, as well as for females under certain states of their system. It is likewise hurtful to persons having a very excitable vascular system, being upon the whole more suitable for slender persons or those advanced in life, than for the young or very robust.

Coffee, like all stimulants, when used to an injurious extent, gives rise to disturbances of the nervous system, particularly painful twitchings of the upper eye-lid, to congestion or hæmorrhages, loss of digesting power, and obstruction of the liver and *vena porta*. Unlike the nervous symptoms caused by tea, the greatest number of these complaints subside or disappear on discontinuing the use of the strong beverage.

Coffee is much more extensively used as an article of diet than of medicine. Raw coffee, either in the form of powder or of infusion, has been found very serviceable in the cure of intermittent fevers. (*Edinburgh Medical and Surgical Journal*, No. lxii.) A strong infusion of coffee without sugar or milk often removes megrim or hemicrania; and also in some cases of asthma, either alone or with tincture of opium, it has kept off the paroxysm. Strong coffee is the best and safest means which can be employed by unprofessional persons to obviate the effects of all vegetable poisons which act upon the brain, and induce a fatal sleepiness and torpor. It is much more proper than vinegar, which should never be given till all the poisonous substance has been removed from the stomach.

In some affections of the kidney and bladder, such as laxity and debility of these organs, coffee is of much service; and it has been stated by some writers that calculous complaints have diminished since its more extensive use.

Cafeine has not yet been used in medicine, but Geiger justly anticipates that a principle so rich in nitrogen will be found to be an important medicinal agent.

A beautiful green, which is unchangeable, and resists the action of acids, light, and moisture, may be precipitated from a decoction of decayed coffee, by means of pure soda. [Cafeic Acid.]

COFFEE TRADE. (French, *Café;* German, *Koffe, Koffebohnen;* Dutch, *Koffy, Koffebomen;* Italian, *Caffè;* Spanish, *Café;* Turkish, *Chaube;* Swedish, *Koffe;* Russian, *Kofé.*) It appears from estimates carefully formed, that the quantity of coffee annually exported from the various countries where it is grown cannot be much under 120,000 tons. This great branch of commerce has been wholly created since the beginning of the eighteenth century. Nearly all the coffee which now comes to Europe is the produce of trees propagated from a single plant, which having been raised from seed procured from Mocha in Arabia by Van Hoorn, governor of Batavia, was sent by him to the botanical garden at Amsterdam, and the progeny of which was, in the year 1718, twenty years after its reception from Java, sent to Surinam. The following statement exhibits as near an approximation as can be made to the quantities which on an average are shipped from the different places of its production:—Brazil, 72,000,000 lbs.; Cuba, 64,000,000; Hayti, 40,000,000; Java, 32,000,000; British West Indies, 25,000,000; Dutch Guiana, 10,000,000; States of South America, 8,000,000; French West India Colonies, 4,000,000; Porto Rico, 4,000,000; Sumatra, 3,000,000; Ceylon, 2,000,000; Bourbon, 2,000,000; Manilla, 2,000,000; Mocha, 1,000,000:—total, 269,000,000 lbs., or 120,000 tons.

The quantities ascertained by official documents to have been imported in one year into different countries are—France, 29,650 tons; United States of America, 46,070, Trieste, 9000; Hamburg, 20,620; Antwerp, 10,000; Amsterdam and Rotterdam, 8530; Bremen, 4,500; St. Petersburg, 2000; Norway and Sweden, 1470; Denmark, 1400; Spain (from Cuba only), 1000; Prussian Ports, 930; Naples and Sicily, 640; Venice, 320; Fiume, 170; United Kingdom, 18,250 (average of ten years):—total, 154,550 tons.

These quantities evidently do not comprise the whole amount of coffee that passes annually between different countries; it is not possible to ascertain that total quantity, because no records of their trade are published by some governments. On the other hand some proportion of the imports as given above are again exported, and appear more than once in the list; which for this reason, deficient as it is, yet exhibits a larger quantity than the whole presumed exports from the countries of production.

The imports, exports, and consumption of coffee in and from the United Kingdom in each year, from 1820 to 1835, have been as follows:—

	Imported.	Exported.	Taken for Consumption.	Rate of Duty, per lb.	s.	d.
	lbs.	lbs.	lbs.			
1820	48,841,626	44,440,869	7,103,409			
1821	45,237,869	41,635,956	7,593,001	On Foreign Coffee	2	6
1822	44,093,124	35,825,535	7,669,351	,, East India .	1	6
1823	45,053,373	30,025,691	8,454,920	,, Brit. Plant. .	1	0
1824	50,674,249	39,517,736	8,262,943			
1825	52,597,518	27,392,389	11,082,970			
1826	42,017,103	31,894,273	13,203,3 3			
1827	47,938,047	29,475,870	15,566,376			
1828	41,069,731	23,785,930	17,127,633			
1829	39,071,215	23,023,410	19,476,180	On Foreign Coffee	1	3
1830	40,952,163	20,087,994	22,691,522	,, East India .	0	9
1831	43,007,828	22,485,474	22,740,627	,, Brit. Plant. .	0	6
1832	50,225,939	25,719,742	22,952,527			
1833	34,426,109	15,319,578	22,741,944			
1834	41,865,111	15,250,480	23,785,095			
1835	28,398,493	13,346,537	23,295,046			

It appears from these figures that the reduction of the duty in 1825 was followed by an immediate and rapid increase in the consumption, which rose from 8¼ millions of pounds in 1824 to more than 22½ millions in 1830. At this point, the consumption having overtaken the supply of those kinds which were admissible at the lowest rate of duty, the progress stopped short, and the consumption has since remained almost stationary. To remedy this disadvantage, the duty on coffee, the produce of British possessions in India, was at the end of 1835 reduced to an equality with the rate charged on coffee of the British plantations; but it appears doubtful whether the benefit of the revenue will not before long require that the duty on coffee of foreign growth should also be brought more nearly to an equality with that charged on other kinds, which are now effectually shut out from the English market by a discriminating duty of 84*s*. per cwt.

The effect of equalizing the duties upon East India and British plantation coffee has been to increase the total consumption of the kingdom to the extent of 1,783,244 lbs. during the first eight months of 1836, as compared with the corresponding period of 1835; which rate of increase, if continued throughout the year, will raise the annual consumption to 26 millions of pounds, or more than three times the quantity used before the reduction in 1825.

The price in London of fine Jamaica coffee in the beginning of each year, from 1820 to 1836, has been as follows:

1820	133*s*. per cwt.	1826	100*s*. per cwt.	1832	100*s*. per cwt.
1821	121 ,,	1827	95 ,,	1833	84 ,,
1822	109 ,,	1828	80 ,,	1834	112 ,,
1823	134 ,,	1829	76 ,,	1835	125 ,,
1824	120 ,,	1830	78 ,,	1836	120 ,,
1825	102 ,,	1831	78 ,,		

The quantities of coffee subject to different rates of duty, which were imported, re-exported, and consumed in 1835, were as under:

	Imported.	Re-exported.	Consumed.
	lbs.	lbs.	lbs.
Of British Plantations .	14,817,046	200,253	17,696,129
,, East India . .	7,167,914	2,616,881	5,596,791
,, Foreign Plantations .	6,613,533	10,529,393	2,126
Total . .	28,398,493	13,346,537	23,295,046

The net revenue derived from this source in 1835 was 652,123*l*.

Nearly one half of the exports in that year were made to the Netherlands: viz., to Belgium 4,671,861 lbs., and to

Holland 1,777,931 lbs. Italy took 1,735,103 lbs., other ports in the Mediterranean 1,301,836 lbs.; Germany, 1,263,447 lbs.; Russia, 1,342,254 lbs.; Denmark, 629,167 lbs.; and Norway, 310,459 lbs. The shipments to other countries were individually of inconsiderable amount.

COFFERDAM, called by the French Batardeau, is a wooden enclosure formed in a river in order to obtain a firm and dry foundation for the piers of a bridge. The Cofferdam consists of piles, which are squared beams of wood, pointed at one end and shod with iron, and surrounded at the top with an iron collar; these piles are driven into the bed of the river, and being braced together, form a wall of wood. The piles are sometimes grooved and tongued together; in other cases they are driven at short distances apart, and boards are let into the grooves formed down their sides. Two such enclosures are formed, one within the other, and the space between the two is filled with clay or chalk rammed down hard. The water in the inner enclosure is then pumped out, and the object for which the cofferdam was constructed is attained.

If the river is rapid and deep, it will be necessary to use several rows of piles in forming these wooden walls. Cofferdams have been constructed of the depth of forty-five feet in the water.

In lieu of cofferdams, caissons have been sometimes employed. Caissons are enormous boxes framed of wood, and made water-tight; the sides are so constructed, that after the piers are built they can be detached, the bottom only remaining as a foundation. The largest caissons ever constructed were those of Westminster Bridge, framed with 150 load of fir timber each. For a correct view of the interior of a cofferdam, see No. 275 of the 'Penny Magazine,' in which there is a view of the cofferdam employed for the repair of Blackfriars Bridge. Alberti is, we believe, the earliest writer on cofferdams.

COFFIN, the box or chest in which dead bodies are put into the ground; also in modern English a mould of paste for a pie: from the Latin *cophinus*, and that from the Greek κόφινος, which properly meant a wicker basket. Wyntown, in his 'Chronicle,' uses *cofyne* for a shrine or box. The kistvaen, or coffin composed of rough stones, set edgewise at the sides and ends, and covered with one or more flat stones, was common among the Britons, and a few such are still seen in Wales. Stone coffins are frequently discovered in barrows which also contain Roman urns, proving their use in England at that period. Sir Christopher Wren found such of the Saxon times, at the rebuilding of St. Paul's: and Gough adds that, from the ninth century to the reign of Henry III., stone coffins were in general use, that is, for persons of the higher classes. The bodies of the common people, not only in the Norman but also in the English æra, as we see in the illuminations of antient missals, were only wrapped in cloth, and so put into the ground. In this manner, Matthew Paris informs us, the monks of St. Alban's were buried, till the time of Abbot Warin, who died in 1195. He ordered that they should be buried in stone coffins, as more decent. Matthew Paris, on this occasion (*Vit. Abb. S. Alb.*, p. 95), charges him with innovations on established customs, to please the multitude. Strutt says, in the reigns of Henry V. and VI., stone coffins were made with necks, distinguishing the head and shoulders. Coffins both of lead and wood are of early use. The former occur in numerous instances through different centuries: and that the Saxons buried in coffins of wood, occasionally, we have the testimony of Bede. Ceadda was so buried (*Hist. Eccl.*, l. iv., c. 3), as was Etheldreda, wife of Egfrid, king of the East Angles. (*Ibid.*, l. iv., c. 29.) Sebba, king of the East Saxons, was buried at St. Paul's in a coffin of grey marble. (*Ibid.*, l. iv., c. 11.) The forms and ornaments of various antient coffins, mostly of stone, may be seen in the plates of illuminations in Strutt's *Manners and Customs*, vol. i., pl. xxxix., xlv., lxvi., and in Gough's *Sepulchral Monuments*. We have a remarkable instance of the use of the word coffin for an ordinary chest, in the Wardrobe Accounts of King Edward IV., 8vo. Lond., 1830, p. 125:—'For closyng and fastenyng of divers *cofyns* of fyrre, wherein the kyng's books were conveyed and caried from the king's great wardrobe in London to Eltham, v^{d}.'

COG. [WHEEL.]

COGNAC. [BRANDY. CHARENTE.]

COHESION (*co-hærere*, to hold together) means the common phenomenon of the adherence or coherence of particles of matter, by which they form collective masses, requiring the application of more or less force to separate the parts.

According to the common notion entertained of matter, it is solid, or at least composed of particles which come into absolute contact. If we could substantiate the first supposition, it would still be apparent that the term *force of solidification* must take the place of *force of cohesion*, and give rise to inquiries into its quantity and mode of action: and even if we could imagine absolute contact of particles, we should find it necessary to append a notion of some force by which particles in contact remain in contact when some of them are put in motion, so as to draw the rest after them. But the balance of probabilities is very strong indeed against the supposition that matter is composed of particles in contact; so much so, that we are almost entitled to conclude it to be composed of particles separated by interstices of much greater dimensions than the particles themselves. If any one should assert the particles of the densest matter to be as far apart in proportion to their bulk as the bodies of the solar system, it would be impossible to bring any direct evidence in contradiction.

Such being the case, we may ask—1. What is the force of cohesion? for such a force there certainly is. 2. What is that law of action by which the particles of bodies are not drawn into absolute contact, but compelled to remain separate, and yet prevented from separating indefinitely?

With regard to the first question, it is most probable that as two bodies approach each other, a strong repulsive force is the cause of the first phenomenon which is perceived. When one billiard ball strikes another, we have no evidence, except that of our senses, of absolute contact taking place: that is to say, we only know that the first visible action takes place when the distance of particles is too small for the eye to perceive. All the evidence which is at all conclusive, is against the supposition of such contact being produced: and we are obliged to admit that our explanation must end in the statement that, arise from whence it may, there is a power in matter by which other matter is repelled, and which begins to act before contact has taken place. But if two pieces of solid matter be pressed together with great force, it would seem as if the particles would thereby be brought within a degree of nearness at which an attractive force begins to act. Two bits of lead pressed together remain in coherence even in a vacuum; and metal plates can be hammered together until the cohesion is as strong as if they had been naturally united.

The cohesive force is an absolute phenomenon, but if we suppose the particles of matter not in contact, it then becomes necessary to admit a new repulsive force, of which the sphere of action is interior to that of the cohesive force. Complete interstices can only exist upon the supposition that, at a certain distance, the cohesive force is destroyed, or at least overcome, by a counterbalancing repulsion. From the known effects of heat, it is supposed that caloric, a name which indicates the cause of heat, plays a prominent part in the production of the repulsion. Nothing positive, however, has yet been established on this subject: we can only make use of phenomena as they exist, to overturn the common impressions, by means of which *force*, the great agent of the universe, meaning the cause of visible display of motion excited or motion prevented, is postponed to notions of *matter*, or *impenetrability*, or similar words, which, if made accurate by close attention, and freed from such latent assumptions as arise from the unassisted senses, will be found to amount to the same idea.

In the article ATTRACTION we had to deal for the most part with assumed forces, of which the effects are seen to coincide with the case of nature only by long and difficult mathematical deduction. In treating of attraction of cohesion we have the indications of real physical attraction [ATTRACTION] in a less difficult form. The arguments against absolute contact are almost insuperable: if we yield to them, we are immediately obliged to admit that particles really act on each other at a distance. Nor will any suppositions as to caloric afford us the means of avoiding such a conclusion. If caloric be matter, we must first explain *its* cohesion or repulsion before we can apply it to explain that of other matter: if caloric be not matter, we gain nothing in the way of avoiding difficulty; for an agent which is not matter, but something

else, with new properties superadded to the common and visible properties of matter, is as difficult as ordinary matter with the express addition of power over other matter at a distance. And it must be observed, that if we are rationally compelled to allow such power to a particle upon a particle, there is no new difficulty in the attraction of *gravitation*. If A can act upon B at the millionth part of an inch, there is no *à priori* difficulty in the notion that two A's together can act on B at twice the distance with as much visible effect as a million of A's collected can act at a million of times the distance, and so on. It must not however be supposed that we mean to infer that gravitation and cohesion are both referable to the Newtonian law of attraction: all that is assumed in the latter refers to particles or masses supposed to be at sensible distances from each other, without either affirming or denying anything as to the modifications which the law may undergo at distances so small as never to be subjects of consideration in comparing one planet with another, or one leaden ball with another, as in Cavendish's experiment. [ATTRACTION.]

We may make it apparent to the mathematician that laws of attraction may very easily be expressed which shall combine the leading circumstances connected both with gravitation and cohesion in one formula. Let us suppose, for instance, that at the distance r, the accelerating force of two equal particles on each other is expressed by

$$\frac{a}{r^m}\left(1-\frac{b}{r}\right)\left(\frac{c}{r}-1\right)+\epsilon^{-\frac{m}{r}}\cdot\frac{n}{r^2}$$

positive values denoting attraction, and negative values repulsion. If a and m be made sufficiently small, the first term may be made insensible at all finite distances, and the second as near as we please to the Newtonian law. But when r is very small, the second term becomes insensible, and such a value may be given to n that the first term shall be of sensible value, as follows: Let c be greater than b, both being quantities of that order of smallness at which the Newtonian term becomes insensible. Then when r is little greater than c, the first term is negative; when r lies between c and b, it is positive; and when r is less than c, it is negative again.

The solid, fluid, and gaseous states of matter show the rise and progress of a repulsive force generally produced by the action of heat. In the first, the particles absolutely attract, in the third they absolutely repel, each other; but in the second the repulsive force almost counterbalances the attractive force, leaving only enough to create that weak degree of cohesion which exists in fluids, or at most that semi-cohesion which is observed in birdlime, in gum-water, and the like. The transition from complete solidity to the gaseous state appears to be made through various degrees of fluidity, and the gradual hardening of melted sealing-wax is a familiar instance of a part of the gradation.

It is impossible to do more than point out the manner in which leading phenomena are explicable on the notion of attraction and repulsion. Mathematical analysis is not yet sufficiently powerful to enable us to say whether such a formula as we have enunciated above could be made to give the numerical phenomena of cohesion.

The practical considerations connected with cohesive forces will be treated under the usual heading [STRENGTH OF MATERIALS].

COHORT was a division of the Roman legion. The term (cohors, or chors. the Greek χόρτος) originally signified an enclosure for sheep or poultry, and was afterwards used to designate the number of men which could stand within such an enclosure. The Roman legion, as well as the citizens at the census [CENSUS], was subdivided into centuries. A century did not always consist of a hundred: the number varied. A legion consisted of ten cohorts; each cohort contained three maniples, and each maniple two centuries; hence there were thirty maniples and sixty centuries; and in the whole legion there must have been sixty centurions. The different centurions received names indicative of their rank. Of the two centurions in a maniple, one ranked before the other, and had the title prior; the second was called posterior. The first centurion of the first maniple had the charge of the eagle, the great standard of the legion: he was ranked with the equites. He was called centurio primi pili (*Livius*, xxv., 19), or simply primus centurio, or primus pilus (*Cæsar*, *De Bell. Gall.* ii. 25). The office was lucrative, but it was not always the reward of merit: favour or money in some cases procured it (*Cicero*, Pis. 36); under the emperors it was bestowed generally from caprice (*Vegetius*, xi. 3, in Pitiscus, *Lexic. Antiq. Rom.*) The badge of a centurion was a vine rod, which the soldiers sometimes felt (Tacitus, *Ann.* i. 23).

The cohortes alares, or alariæ (*Liv.* x. 40, 43), were the troops of the auxiliaries and the allies which were stationed in the wings (alæ).

The cohors prætoria was a select band which usually attended the prætor (Sallustius, *Catil.* c. 60); (Pitiscus, *Lexicon Antiquit. Rom.*, *in Cohors*, *Centurio.*)

COIMBATORE, a province situated in the region of the Eastern Ghaut mountains, in the South of India, about the 11th degree of north latitude, and bounded on the north by Mysore, on the west by Malabar, on the south by Dindigul, and on the east by Salem and Trichinopoly. The length of the province from north to south is 50 miles, and its breadth from east to west about 45 miles. The surface of the country varies exceedingly. Towards the south the level is not more than 400 or 500 feet above the sea, but it gradually rises towards the north, and even in what is considered the low country the level rises to 900 feet above the sea. About 11° 35′ N. lat., the mountains called the Eastern Ghauts occur; the Kumbetarine hill, in 11° 35′ N. lat., and 77° 20′ E. long., is reckoned to be 5548 feet above the level of the sea. Some summits of the Neelgherry mountains, which are in the north-west part of the province, and unite the Eastern and Western Ghauts, are still higher: one of the peaks called Moorchoorti Bet is 8800 feet above the sea. The soil is generally dry, but in the south there is some marshy ground. The low country is effectually sheltered from the violence of the south-west monsoon. The climate is considered healthy, and in particular the Neelgherry mountains are resorted to by Europeans resident in India for the recovery of their health. In these hills the mean temperature in April and May is 65° Fahrenheit. During the cold season the thermometer sometimes sinks to the freezing point, when the air is peculiarly clear and elastic, and produces a cheering effect upon the spirits. Coimbatore is watered by the rivers Bhavani, Amaravati, and Cavery, the first and second of which fall into the Cavery; the Bhavani, at Bhavani-Kudal, 58 miles north-east from the town of Coimbatore, in 11° 26′ N. lat., and 77° 44′ E. long., and the Amaravati about 10 miles below the town of Caroor. These rivers are filled by both monsoons; by the south-west in June, July, and August, and by the north-east in October, November, and December. The extent of land under cultivation in 1814-15 was 960,000 acres, and in 1825-26 was increased to 1,451,439 acres. Up to the former period the land revenue of the province was collected under the village system, but a permanent assessment being then made, not only upon every farm, but upon each field, and the ryots being confirmed in the possession of their lands, the improvement here noticed began. The government has fully participated in this advantage; in 1814-15 the land revenue was 18,64,391 rupees, and in 1825-26 had advanced to 23,79,633 rupees, being an annual increase of 51,524*l.* In 1814-15 the government assessment was considered to be equal to one-third of the gross produce of the soil, and in 1825-26 it did not exceed one-fifth; the price of land during that time was doubled. The population of the province in 1828 was 870,866; in 1823 it was stated to be 638,199; but in this latter number children under five years of age were not included. The means for education provided by the government are miserably deficient. According to the latest returns, the whole number of scholars was only 8930, of whom 8618 were Hindus, including 82 females, and 312 were Mohammedans.

The principal places in the province, in addition to the capital, Coimbatore, are, Animalaya, Aravacourchy, Bhavani-Kudal, Caroor, Daraporam, Erroad, Palachy, Satimangalum, and Sivana Samudra. Animalaya is on the west side of the small river Alima, in 10° 31′ N. lat., and 77° 1′ E. long. This town, which contains about 400 houses, is the common thoroughfare between Malabar and the southern part of the Carnatic. A fort stands at a short distance west of the town, and had fallen into decay, when, to provide materials for repairing it, Tippoo pulled down five large temples. The forests in the neighbourhood contain abundance of fine timber, which is of little value from the want of means for transporting it. Aravacourchy, the seat of Arava, so called from the name of the founder, is

situated in 10° 41′ N. lat., and 77° 54′ E. long. The town was destroyed towards the end of Hyder's reign, by an English force under Colonel Laing, but it has since been rebuilt, and at the beginning of the present century it already contained 250 houses, and was fast increasing: the inhabitants mostly speak the Tamul language. Bhavani-Kudal, at the confluence of the Bhavani and Cavery rivers, contains two celebrated temples, one dedicated to Vishnu and the other to Siva, and is considered a place of great sanctity by the Hindus. Caroor, on the north side of the Amaravati river, in 10° 53′ N. lat., and 78° 4′ E. long., is a considerable town, and contains 1000 houses; it was formerly a place of great commercial activity, but its trade has long since been greatly diminished. Daraporam, or more properly Dharma-puram, is a populous town situated in an open country near the Amaravati, in 10° 37′ N. lat., and 77° 35′ E. long. The streets are wide and regularly laid out, and many of the houses are spacious. Erroad was a very considerable place during Hyder's reign, and contained 3000 houses; under the government of his successor it was much reduced; and during the invasion of the country by the English under General Meadows, the town was in a great measure destroyed. It has since been partially restored, and has been made a military station. Palachy is a small but thriving town, situated in a well-cultivated country, in 10° 39′ N. lat., and 77° 6′ E. long. Some coins of Augustus and Tiberius have been dug up in the vicinity. Satimangalum, a town and fortress, in 11° 31′ N. lat., and 77° 16′ E. long., contained, in Hyder's reign, about 800 houses, but the number has since been much reduced. The fort is large, and the town is built in a straggling manner about the plain; it contains a large temple dedicated to Vishnu. This place is considered unhealthy, and the air is mostly intensely hot. The island of Sivana Samudra, formed by the Cavery, is the site of the antient Hindu city of Gunga Raja; two cataracts are here formed by the Cavery, one on its northern and the other on its southern arm. [CAVERY.] The city of Gunga Raja, supposed by Dr. Buchanan to have been founded not more than 300 years ago, is now completely destroyed; the southern gate of the wall by which the city was surrounded may still be seen, and one principal street, about a mile in length from north to south, may be traced: there are besides visible the ruins of several Hindu temples, in one of which is a colossal statue of Vishnu; but the whole place is choked by jungle, and occupied by banyan and other forest trees.

A considerable quantity of dry grain is raised in the province; cotton and sugar are likewise cultivated, and weaving is carried on extensively.

This province was acquired by the British from the rajah of Mysore in 1799.

(Rennell's *Memoir of a Map of Hindustan*; Buchanan's *Journey through Mysore, Canara, and Malabar*; *Report of Committee of House of Commons on the Affairs of India*, 1832.)

COIMBATORE, the capital of the province, in 10° 52′ N. lat., and 77° 5′ E. long., is a well-built town, containing about 2000 houses, being little more than half the number which it contained under the government of Hyder Ali. His son Tippoo sometimes resided at Coimbatore, where he built a mosque. About two miles from the town, at a place called Peruru, is a celebrated temple dedicated to Iswara, and called *Mail* (high) *Chitumbra*, to distinguish it from another Chitumbra near Pondicherry. The idol is said to have placed itself here at a very remote period, and about 3000 years ago the temple was built over it by a rajah of Madura. This building exhibits a profusion of Hindu ornaments, but is destitute of elegance, and the figures are not only rude, but many of them indecent also. This temple was plundered of its gold and jewels by Tippoo, who excepted it, however, from the general order which he issued for the destruction of all idolatrous buildings; and although its splendour was then destroyed, the Brahminical worship has always been continued.

The town was taken by the English in 1783, but was restored at the peace in the following year. It was again taken by the English in 1790, and retaken by Tippoo's general, but was transferred with the province to the British government in 1799, and has since remained in their possession. The travelling distance from Seringapatam is 192 miles, and from Madras 306 miles.

(Rennell's *Memoir*; Mill's *History of British India*; Buchanan's *Journey through Mysore, &c.*)

COI'MBRA, a town and bishop's see in Portugal, in the province of Beira, and the chief town of a comarca, or administrative division. It lies on the slope of a hill on the right or north bank of the Mondego, about 120 miles N.N.E. of Lisbon, and 25 N.E. of the seaport of Figueiras at the mouth of the Mondego, in 40° 12′ N. lat. and 8° 17′ W. long. A fine bridge connects the town of Coimbra with the splendid and extensive monastery of Santa Clara, situated with its gardens upon a hill on the south bank of the Mondego. To the north-east of Coimbra rises the high ridge of Busaco, and on the west and south-west a fertile but marshy and unwholesome plain extends towards the sea. The town is old-fashioned, and most of the streets are narrow, steep, ill-paved, and dirty. There are, however, several fine buildings, such as the palace of the university, once the residence of the kings, and the various colleges connected with it, the cathedral, besides other churches and convents, and several squares adorned with fountains, which are supplied through a fine aqueduct adjoining the town. The university was transferred to Coimbra from Lisbon by King Denis in 1308. It was afterwards removed again to Lisbon, but John III. transferred it again to Coimbra in 1537. In 1653 King John IV. issued regulations for the university, 'Estatutos da Universidade de Coimbra,' printed in 1654. Pombal, in 1733, effected several useful reforms in the system of instruction, and added the faculties of mathematics and natural philosophy to those of theology, canon and civil law, and medicine, already existing. He also gave to the university several buildings belonging to the suppressed order of the Jesuits. No student is permitted to attend a course of lectures in any of the faculties without having first undergone one year of preparatory study in the Royal College of Arts. The course of theology lasts five years. The same time is allotted to the canon and civil law, after which the student can obtain his Bachelor's degree, which qualifies him for the bar, or for inferior appointments in the magistracy. In order to obtain the degree of Doctor a sixth year is required, after which the candidate undergoes a private examination. In the faculty of medicine eight years' attendance are required, and an additional year for the Doctorship. The course of philosophy lasts four years. The lectures begin in the autumn and last till May, after which the public examination takes place till July, followed by three months' vacation. The public examinations are in Portuguese, and are said to be very severe. The university is very rich, and the emoluments of the professors are respectable, besides which they have the prospect of preferment in the civil and ecclesiastical departments. A Doctor's degree in the university is a necessary qualification for the higher stations in the church and magistracy.

The government of the university is vested in a council, consisting of the rector, who is appointed by the king for a limited time, the deans of the various faculties, two sindicoes or fiscals, and a secretary. The financial administration is intrusted to a separate council, 'Junta de Fazenda,' consisting of three professors, a treasurer, and a clerk. The library of the university occupies three large halls filled with books chiefly of antient date. It is opened every evening, for the use of the students, at the conclusion of the public lectures. The library of the Benedictine convent is better both in number and choice, and contains works of more modern date. The lectures on canon and civil law are the most attended to, on account of the great demand for law graduates for civil offices in the various towns of the kingdom. The average number of academical students is said to be about 1200. The medical students use French and English works. The lectures are generally gratuitous. The annual necessary expenses of a student during his nine months' attendance are equivalent to about 30*l.* sterling. There is a botanical garden, a museum of natural history, with a collection of minerals, a chemical laboratory, and an observatory well furnished with instruments. (Kinsey, *Portugal Illustrated*, 1828.) The large monastery of Santa Cruz, in the lower part of the town, contains the monument of Affonso Henrique, the founder of the monarchy, and other early kings. In the great hall of the university, where the public examinations and disputations are held, is a complete collection of the portraits of the Portuguese kings; and the apartment where the candidates for the Doctorship undergo their last ex-

amination in private contains the portraits of the successive rectors of the university. (*Ibid.*)

Coimbra has 19,850 inhabitants distributed into eight parishes, an hospital, a house for the poor, and a Magdalen. It has several manufactories of pottery. The civil magistrates are the Corregidor and seventeen Juezes de Fora. (Miñano, *Diccionario Geografico, & Suplemento.*)

The immediate neighbourhood of Coimbra is delightful, and filled with gardens and quintas, or country-houses. The tract of country between it and Condeixa, south of the Mondego, is styled the fruit-basket of Portugal. In the same direction, not far from the convent of Santa Clara, is the Quinta das Lagrimas, in a romantic sequestered spot, where Donna Inez de Castro is reported to have been murdered. (Camoens, *Lusiadas.*)

Conimbrica, the antient Coimbra, is said to have been built by the Romans, though at some distance from the present spot; but Miñano asserts that its name is of Arabic origin. Others say that the present town was first built by Ataris, one of the Gothic kings. The view of the town from the south bank of the river is very fine, the summits of the heights above being covered with convents and public buildings. Coimbra lies on the high road from Lisbon to Oporto, and its fine bridge affords the principal means of land communication between the north and the south provinces of the kingdom.

COIN: metal stamped for currency; derived by some from the Greek *κόινος, common;* by others from the Latin, cuneus, *a wedge;* the first currency of metal, in all probability, being in the form of wedges, or ingots. Commerce, in the earliest periods, was carried on by the mere exchange of articles, and it is remarkable that throughout the early part of Scripture, as well as through the poems of Homer, not a single passage occurs from which we can infer either the use or the existence of stamped money. Metals, however, being close and compact in form, universal as to use, and admitting of division into larger or lesser parts, soon became the representatives of value, though at what exact period remains in doubt. Herodotus, i. 94, speaking of the Lydians, expressly says they were the first people on record who coined gold and silver into money. The Parian Chronicle, however, ascribes the origin of coined money to the Æginetans, under Pheidon, king of Argos, 895 years before Christ. Ælian, in his 'Various History,' corroborates this statement as far as the Æginetans are mentioned: and our best numismatic antiquaries agree in considering the coins of Ægina, from their archaic form and appearance, as the most antient known. They are of silver, and bear on the upper side the figure of a turtle, and on the under an indented mark, as if the metal, at the time of striking, had been fixed upon a puncheon, and from the weight of the blow had received a deep cleft. In later coins of Ægina, the turtle has been changed to a tortoise, and the fissure on the other side converted into a device. The coins of Lydia probably come next in point of antiquity, and then the early Darics of the Persian kings, which occur both in gold and silver, and bear a strong resemblance to the coins of Ægina in the mode of striking; these, if they are to be referred to Darius the First, must have been coined between B.C. 522 and 486. The richer the metal, the smaller and more portable was the quantity required for the coin. There are coins in gold of the early kings of Persia, similar in type to the silver Darics, and of very minute size.

The study of coins is not to be considered as the province of the antiquary alone. Coins are among the most certain evidences of history. In the later part of the Greek series they illustrate the chronology of reigns. In the Roman series they fix the dates and succession of events. Gibbon observes that if all our historians were lost, medals, inscriptions, and other monuments, would be sufficient to record the travels of Hadrian. The reign of Probus might be written from his coins. In illustrating the history and chronology of sculpture and antient marbles, coins enable the scholar and the artist not only to discern those peculiarities which characterise style, as it relates to different ages and schools, but to ascribe busts and statues to the persons whom they represent. The personation of the different provinces, too, forms another point of interest upon the Roman coins. Coins are frequently essential to the illustration of obscure passages in antient writers; and preserve delineations of some of the most beautiful edifices of antiquity not existing now even in their ruins. Addison, in his 'Dialogue on the Usefulness of Antient Medals,' has long convinced the world of the connexion of this science with poetry. As a branch of the fine arts, it may be sufficient to say that some of the medals of Sicily belong to a period when sculpture had attained its highest perfection. We would particularly refer to the coins of Syracuse. In every quality of art, too, the Roman coins, to a certain period yield to the Greek alone. From Augustus to Hadrian the Roman mint was the seat of genius: and coins of admirable execution are found even down to the time of Posthumus.

The generality of numismatic writers divide coins into Antient and Modern;—the Antient, into the great divisions of Greek, Roman, and Barbarian.

The *Greek* they divide into cities and kings. Of the first they can make no chronological arrangement: it is alphabetical, under the different countries. The kings commence with the age of Alexander the Great, and belong to the four kingdoms into which his empire was divided, besides the kingdom of Epirus. This series, in a chronological point of view, closes with the extinction of the dynasty of the Lagidæ in the Augustan age. The coins of the Greek cities were impressed either with appropriate symbols or the heads of deities. The coins of the monarchs bore the heads of the respective princes. Pinkerton observes that the first copper coins of Greece known are those of Gelon king of Syracuse, about 490 years before our æra. These were called Chalci, pieces of brass; others, of a more diminutive size, were called Lepta, or Kerma, as being change for the poor. He considers there is no proof of the coinage of gold in Greece before Philip of Macedon. Athens had no gold money at the beginning of the Peloponnesian war.

The *Roman* coins are divided into consular, imperial, and medallions. The subdivisions of the consular are into Roman asses and coins of the families. Of the imperial there are two subdivisions, Roman and Grecian; the latter being again subdivided into those of provinces, colonies, and municipia. The medallions are likewise divided into Roman and Grecian. The earliest coinage of Rome was of copper, and took place in the reign of Servius Tullius, probably about five centuries before Christ. The Romans are supposed to have borrowed the art from their neighbours, the Etruscans. Of the as, its divisions and its compounds, we have already spoken in a former article. On some of the later Roman, as well as on what were called the Italian asses and their parts, the practice became prevalent of placing the names of many of the principal families of Rome upon the fields of the coins. These form the division which are called family coins. The silver coinage of Rome was introduced in the year 266 before Christ, when the denarius was so termed from its being equivalent to ten asses. Pliny informs us (*Nat. Hist.* xxxiii. 13, edit. Hard. ii. 612) that the coinage of gold was introduced sixty-two years after that of silver. The largest piece of gold was called aureus. [AUREUS.] The imperial coins of Rome form the most complete and most interesting series of any extant. Those of copper being found of different sizes, are distinguished into first, second, and third brass: in historical importance, as well as for the devices, the largest series is to be preferred. The largest imperial brass coin was the sestertius, and from the Augustan age went by the name of nummus, or æreus. It was worth twopence English. All the large brass coins are of yellow metal; the middle brass, yellow and red; the small, mostly red. No sensible diminution of the sestertius took place till the reign of Alexander Severus, when it lost upwards of a sixth of its weight, and continued to diminish till the reign of Gallienus, when it totally vanished. In this reign the chief copper coins in use were the small brass, or assaria, which, according to the writers of the Lower Empire, were at last numbered at sixty to the silver denarius. Under Valerian and Gallienus, copper washed with silver appeared. In the reign of Diocletian, a coin denominated the follis supplied the place of the sestertius; but the denarii ærei continued quite common down to Constantine I. He introduced a new coinage, and then the follis had its changes and its subdivisions; but its appellation adhered to what had now become the largest brass coin of the Roman empire, to the very latest notices which we have of the Byzantine money. From the time of Augustus to that of Gallienus, the imperial or silver denarius contained sixteen assaria. Under Caracalla a larger denarius was struck, which had a third more, or twenty-four assaria, and was

called argenteus: the common denarius of silver being then termed minutus. Under Gallienus however the minutus ceased, and argenteus and denarius then became only different names for the Roman silver coin, which at that time contained no less than sixty assaria. Constantine I. introduced the milliarensis, worth somewhere about a shilling of our money: but the argentei, or denarii, were struck as late as the reign of Heraclius. Aurei and semi-aurei were the sole pieces in gold for near three centuries. Till Sulla's time the aureus continued at thirty silver denarii. In the reign of Claudius, and afterwards, it went for twenty-five silver denarii. Under Philip, aurei of two or three sizes first appear, of a rude fabric; one class of which were called trientes. The weight originally given to the aureus was 120 grains; it afterwards fluctuated to between 80 and 90 grains, and was sometimes even of less weight. Constantine I. accommodated the aureus to his new coinage, and gave it the name of solidus, of six in the ounce of gold. The solidus passed for fourteen milliarenses. It went for rather more than twelve shillings of our money, and continued of the same standard to the very close of the Byzantine empire. The medallions were struck both at Rome and in the provinces, whence the division of this class into Roman and Grecian. The term is applied to all those productions of the Roman mint which exceeded the coins ordinarily current in size, whether in gold, silver, or brass. Though generally conceived to have been struck upon similar occasions to those on which we ourselves coin medals, there are still various circumstances which lead to the belief that they were intended for circulation as money. Medallions, says Pinkerton, from the time of Julius to that of Hadrian are very uncommon and of vast price: from Hadrian to the close of the Western Empire, they are less rare. The types of the Roman medallions are often repeated upon common coin. Those struck in the Grecian territories are the most numerous, and are distinguished from the Roman by their thinness and inferiority of workmanship. Many Roman medallions have S. C. upon them, as being struck by the senate; others have not, as being struck by order of the emperor. The Roman medals called Contorniati, it is the opinion of our first medallists, were no more than tickets of admission for different places at the public games.

The third class of antient coins, denominated *Barbarian*, consists of those of Lydia, Persia, Judæa, Phœnicia, Numidia and Mauritania, Carthage, Spain, Gaul, and Britain. The coins of Lydia and Persia have been already slightly noticed. The Darics, from their present extreme scarcity, are supposed to have been melted down for his own coinage by Alexander the Great, upon his conquest of Persia. Pinkerton asserts that all the real Darics were of gold, and that the silver coins with the archer (the same type) are later. Nevertheless many of the silver Darics are equally if not more archaic in appearance. Of Persian coins there is a second series, that of the Sassanidæ, beginning about A.D. 210, when Artaxerxes overturned the Parthian monarchy; they extend to the year 636, when Persia was conquered by the Arabian caliphs. The Hebrew coins were struck under the dominion of the family of the Maccabees, and chiefly in the time of Simon the high-priest, about the year 150 B.C. They are nearly all of copper, and extremely rude in workmanship; the legends are in Samaritan characters, and the symbols are those appropriate to the nation, such as a sprig, considered as Aaron's rod, sacramental cups, censers, &c. The Hebrew shekel, as it is called, is of silver, about the value of the Greek tetradrachm. Hebrew coins pretending to an earlier date than the Maccabees are spurious. The Phœnician coins are in no instance considered older than the time of Alexander the Great, and are chiefly referred to the cities of Tyre and Sidon. The Numidian coins are those of Juba I. and II. The Punic or Carthaginian coins are believed to have been struck by Greek artists. Those of Spain agree in character with the coins of the different nations by whom the several colonies of that country were planted, Phœnicians, Greeks, and Carthaginians; and many of them are inscribed with Phœnician, Greek, and Roman legends: a few others are met with, distinguished by what are called Celtiberian characters, not unlike the letters of the Runic and Etruscan alphabets. Of the coins of Gaul, the most antient have no legends at all; they have very rude devices, and many of them are in base gold: after the Gauls had intercourse with the Romans, some of their coins bear inscriptions which look like Latin, mostly in single words, and not of easy interpretation: they are not unlike many of those which are called early British. Cæsar describes the Britons as a people just emerging from barbarism, and no further acquainted with commerce than to have discovered that it could not be conducted by simple barter alone. His account implies, that however they might have known its use, the Britons had not proceeded so far as actually to coin money: although they had a substitute for it in pieces of brass, or iron rings, or plates regulated by weight. He says, 'Utuntur aut ære, aut annulis ferreis, ad certum pondus examinatis, pro nummo.' (*Bell. Gall.* v. 12.) The passage however is corrupt: for *annulis* some manuscripts read *taleis*, and others *laminis*. Coins however are found in this country which are usually attributed to the very early British kings, in gold, silver, and the inferior metals; ruder in fabric than they would have been had the Britons learned the art of coining them from the Romans. They are without legends, and many of them, like the early Gaulish coins already mentioned, have unintelligible devices: they seem to justify our antiquaries in thinking that Cæsar had not sufficient information to make his testimony quite conclusive. The use of a better sort of money was unquestionably taught the Britons by the Romans very soon after Cæsar's second invasion, when the types improved, and when no one who examines them carefully will doubt that Roman artists were employed upon the dies. The earliest coin which can, with the least appearance of probability, be attributed to any particular British monarch, bears upon it the letters SEGO, possibly for Segonax, one of the four Kentish monarchs who attacked Cæsar's camp at the time of the invasion we have just mentioned; it has also the word TASCIO upon it, which is seen upon numerous other coins which are undeniably British. Cunobelin was a later monarch of Britain, whose name is considered to be abbreviated upon the coins which have CVN, CVNO, and CVNOBELI upon them, together with the words CAMV and CAMVL, the leading letters of Camulodunum, his capital city, supposed to be either Colchester or Maldon in Essex. VER, as well as VERLAMIO at length, for Verulam, occur upon other coins of the same period. One has BODVO, which may or may not be a coin of Bonduca or Boadicea, queen of the Iceni. It is probable that the British coinage closed with the money of Cunobelin; for in a very few years after his decease the second subjection of Britain took place under Claudius, and was so complete and severe, that the country became rather a Roman than a British island. Gildas (*De Excidio Britanniæ*, c. v.) expressly speaks of a Roman edict which ordained that from that time that all money current among the Britons should bear the imperial stamp. That this prohibition was followed up by the establishment of Roman mints in Britain is highly probable: and certain initial letters, as P. LON. for *pecunia Londini*, &c., are brought forward as evidence of the fact; but most of these initials are equally applicable to other places in the Roman empire where mints were established, and therefore do not afford a proof quite so conclusive as is wanted. The coins of Carausius and Allectus, the seat of whose empire was in Britain, have a strong claim to be considered as the production of British mints. Those who wish to see under one view the 'Coins of the Romans relating to Britain,' will find the fullest information in a little volume recently published under that title by Mr. John Yonge Akerman, 12mo., London, 1836.

MODERN COINS are those which have been struck since the fall of the Western Empire; but it is impossible, in the space to which the present article is necessarily confined to enter into minute details respecting the series of coins in each country. We shall be brief in our notices of the greater part, that we may devote a larger space to the coins of England

The series of the coins of Italy under the Ostrogoths began soon after the year 480 of the Christian æra. The French series commences with Clovis, A.D. 490. That of Spain with Liuva, Prince of the Visigoths, soon after the middle of the sixth century, or about A.D. 567. The states of Germany appear to have struck money very shortly after the age of Charlemagne; as well as the independent Lombard cities, and the Neapolitans. The Papal series of money begins with Pope Hadrian I., A.D. 772. Denmark has coins of an early date, but few of them are

intelligible before the time of Canute; contemporary with whose date are the coins of the petty kings of Ireland. In Sweden coinage is said to have begun under Biorno, A.D. 818; and in Norway with Olave or Olaf, A.D. 1066. The Russian coinage is of a later date than the other coinages of Europe. Of Scotland pennies exist ascribed to Alexander I., A.D. 1107: those of William the Lion, A.D. 1165, are numerous. Pennies were the earliest coins in most of the European kingdoms, and a prevailing device upon them was a cross.

The *Coins of England* form the most complete modern series extant. At what time the circulation of the Roman money ceased, we are ignorant: but Sceattæ (from the Anglo-Saxon ſceat, shot, money) are known of the early kings of Kent, some of which must have been struck within the sixth century; and there are others so similar to them in type as to justify their appropriation to the same people, but which from their symbols were evidently coined before their conversion to Christianity. They are too rude generally to admit of description, are of silver, and found of different weights, from seven grains and a half troy to twenty and upwards: their most common weight is from fifteen to nineteen grains. Several plates of these coins are engraved in Ruding; they appear to have been current chiefly from the year 500 to 700. A sceatta of Ethilberht I. of Kent is the earliest Saxon coin which can be appropriated: he reigned from A.D. 561 to 616. Sceattæ also are the only coins which have hitherto been discovered of Ecghbert, king of Kent, who reigned from 665 to 674. In point of antiquity the penny succeeds; the name of which first appears in the laws of Ina, king of the West Saxons, who began his reign in 688. The word has had numerous etymologies; but that from *pendo*, to weigh, seems the most reasonable: it was then, as it still is, the 240th part of the nummary pound. The half of the penny, called helflinge or halfpenige, and the fourth part or feorðung, farthing, are mentioned in the Saxon gospels; and a Saxon halfpenny of Edward the Elder is said to exist in the Bodleian collection at Oxford: but we know little more of the earliest divisions of the penny. The coin ascribed as a penny to Ethilberht II. king of Kent, between 749 and 760, with Romulus and Remus on the reverse, is beyond doubt a forgery. As to the rest of the kingdoms of the Heptarchy, no coins have yet been discovered of the South Saxon monarchs. Of the West Saxon kings, we have coins of Athelheard, A.D. 726; and of Beorhtric, who came to the throne in 784. Mercia seems to have been the most wealthy kingdom, and has a large series. It begins with Eadvald, who ascended the throne in 716, followed by Offa (whose queen Cenethreth or Quindred also enjoyed the privilege of coining), Egcberht, Coenvulf, Ciolvulf I., Beornwulf, Ludican, Wiglaf, Berhtulf, Burgred, and Ciolvulf II., with whose short reign the kingdom expired. The coins of the East Angles begin with Beonna, about the year 690; but in consequence of the temporary annexation of the kingdom to that of Mercia, we have but few coins of succeeding monarchs: those only of Aethelweard, 760, Edmund the Martyr, 855, and Ethelstan, 860, are known. The kingdom of Northumberland has this remarkable peculiarity belonging to its coinage, that from its mints issued, as far as is yet discovered, the only brass coins which were struck by the Anglo-Saxons. The earliest specimen hitherto known is of the reign of Ecgfrith, who ascended the throne in 670: it differs from the stycas of succeeding monarchs in the omission of the moneyer's name on the reverse. Of sixteen succeeding monarchs (whose reigns occupy more than a hundred and thirty years), no coins have as yet occurred. The first that appears was struck by Eanred, who began to reign in the year 808. One silver penny of Eanred is known. His stycas are of various rude types, without any representation of the monarch, but with a legend similar to that on his silver coin, excepting that the moneyer's name stands on the reverse, without any addition. Other stycas occur of Ethelred his son 840, of Redulf, and of Osbercht, whose reign began in 849. After his reign stycas seem to have fallen into disuse, at least none of a later period have yet been found. Stycas were also struck in the Saxon times by the archbishops of York: Ruding has engraved those of the archbishops Eanbald II., Vigmund, and Wulphere. One coin of Regnald, who was expelled the kingdom of Northumberland in 944, is known; and one of Anlaf, which has upon its reverse the Danish raven · these are pennies. Pennies also are known of Eric. At the beginning of the ninth century Ecgbeorht or Egbert ascended the throne of the West Saxon kingdom; and in the course of his long reign brought under his dominion nearly the whole of the Heptarchic states: he is therefore commonly considered as the first sole monarch of England, notwithstanding those states were not completely united in one sovereignty until the reign of Edgar. On his coins he is usually styled ECGBEORHT REX, and sometimes the word SAXONVM is added in a monogram within the inner circle of the obverse: some of his coins have a rude representation of his head, and some are without it. From Egbert's time, with very few exceptions, the series of English pennies is complete; indeed for many hundred years the penny was the chief coin in circulation. Of the Saxon pennies those of Alfred bear a considerable price; on some he is called AELBRED REX, on others ÆLFRED. Edward the Elder has Saxon buildings on the reverses of several of his coins; and on one of Athelstan's is a building intended for York Cathedral. The coins of Canute and of Edward the Confessor are among the most common of the Saxon series those of Harthacnut are rare. English coins of Canute have frequently, and of Harthacnut in a few instances, been found in Denmark. Numerous coins of Canute and Ethelred II. have also been found in Ireland.

The archbishops of Canterbury, during a part of the Anglo-Saxon period, also coined money. Pennies exist of Jaenberht, archbishop of Canterbury, from 763 to 790; of Æthilheard, who died in 803; of Vulfred, who succeeded in that year; of Ceolnoth, who died in 870; of Ethered, 871; and of Plegmund, who sat from 891 to 923. In Athelstan's laws two moneyers are allowed to the archbishop of Canterbury, but no archiepiscopal coins of that reign are known, nor indeed any until the time of archbishop Bourchier, a space of several hundred years. Of Harold II.'s pennies there are three distinct types; two with the head looking to the left, the third, which is of very uncommon occurrence, with the head to the right; all have the word PAX in the centre of the reverse. Of the coins of William I. and II. the best account, with engravings of all the types, will be found in the 'Archaeologia,' vol. xxvi. p. 1—25. Of the types there exhibited, those which bear the strongest resemblance to the coins of the Confessor and Harold are ascribed with great probability to the first William; those which most resemble Henry I.'s coins to William II. The coins which present a sceptre on each side of the king's head, are universally ascribed to the Conqueror· those with two stars to William Rufus, the same ornament occurring upon his Great Seal. Most of them read PILLEM, PILEMV, or PILLEMVS REX A, AN, ANGLO, or ANGLOR; the P in Pillem being in reality the Saxon V (W). Of Henry I.'s pennies the types are as various as upon those of any monarch of the English series: the reverses bear the name of the mint and moneyer. This had been the Saxon practice, and it continued till the reign of Edward I. Our historians say that Henry I. coined halfpence and farthings; but none such are known in our cabinets. Through the Norman times, and certainly in the reign of Edward the Confessor, halves and quarters of the penny, regularly and nicely cut, to go as halfpence and farthings, occur almost whenever parcels of the coins of those periods are discovered. The troubles of Stephen's reign will account for the wretched state in which the pennies of that king occur: these, with what are certainly the earliest pennies of Henry II., are among the worst of the English coins in point of mintage. The barons of this reign are reputed by our historians to have struck coins; but only two or three such are known, and those of persons related to the king. Pennies are extant ascribed to Robert earl of Gloucester, bastard son of Henry I.; to Henry bishop of Winchester, base brother of Stephen; and to Eustace, Stephen's son. They are all of great rarity, as is the coin which bears the full-length effigies of Stephen and Henry II. The coin of Robert however is by some ascribed to Robert duke of Normandy, the eldest son of the Conqueror. Henry II., according to Ruding, had but one type; but there seems every reason to believe that the pennies which usually go by the name of the first coinage of King Henry III. are in reality the last coinage of Henry II. at the time he reformed his money, A.D. 1180. Of Richard I. and John we have no English money; but pence, halfpence, and farthings are extant of John, all struck in Ireland. Those coins with a full face, bounded by the inner circle, have the inscription IOHANNES DOM. and were struck at the

time his father made him lord of Ireland; those which give the face inclosed in a triangle, and IOHANNES REX, were coined after he ascended the throne. The farthing of this last coinage is extremely rare. Of John's coins, Dublin appears to have been the only place of mintage. Henry III.'s pennies (if those which we have considered as the latest pennies of Henry II. really do not belong to Henry III.) have usually the numerals added to his name, HENRICVS REX III. Some of his pennies have HENRICVS REX TERCI, and a few HENRICVS REX ANG. His coinage, if we may judge from the quantity of his pennies which still remain, must have been a very extensive one. Halfpence and farthings are spoken of in a record of this reign, but none have appeared. The pennies of Edward I., II., and III. are usually thus distinguished by our antiquaries: those which give the king's name EDW. are ascribed to Edward I.; those with EDWA., EDWAR., and EDWARD, to Edward II.; those with EDWARDVS to King Edward III. A few with EDW. are known certainly to belong to Edward I., particularly those which have a moneyer's name on the reverse, ROBERT DE HADELEIE, who is known from records to have been a moneyer in 1280. Both Henry III. and Edward I. struck pennies in Ireland, in the manner of John's later coins, representing the king's head within a triangle. Edward I. struck halfpence and farthings in his great coinage of 1279, which are not unfrequently met with in the cabinets of collectors, as well as halfpence and farthings with the Irish type, struck at Dublin and Waterford. It may be sufficient, as regards these small coins, to say that they continued in currency for several centuries. The last silver farthing is known to have been coined in the reign of Edward VI., but no specimen of it has been seen: the last silver halfpenny was struck under the Commonwealth. The penny has continued through every reign to the present. Our limits will not allow of further minute description. Among the rarest in the later part of the series may be reckoned the pennies of Edward VI., Mary, and Philip and Mary. From the reign of Edward I. to Henry VIII., we have pennies which bear the privy marks of the bishops of Durham; from Henry IV. to Henry VIII. we have coins struck in the archiepiscopal mint at York; and others of the see of Canterbury, from archbishop Bourchier to archbishop Cranmer. The first English pennies weigh 22½ grains troy. Towards the close of Edward III. the penny weighs 18 grains, and in the reign of Edward IV. it fell to 12, after previously sinking to 15. In Edward VI.'s time, 1551, the penny was reduced to 8 grains, and after the 43rd of Eliz. to 7$\frac{11}{31}$ grains, at which weight it still continues. The penny affords the best rule for estimating the other silver coins.

According to Grafton, Henry III., in 1249, ordered groats to be stamped, but none such are mentioned in any record. There is a large piece however found occasionally in the cabinets of the curious, sometimes ascribed to Edward I., but whether his, or Edward II.'s, or Edward III.'s, is uncertain. It occurs of different weights, from 80 to 138 grains, and represents the king's head on its obverse, within a double tressure of four arches, with mullets and roses; inscribed EDWARDVS DI. GR. REX. ANGL. The reverse, besides a continuation of the king's titles in the outer circle, has CIVI. LONDONIA within an inner one. There can be little doubt but that it was a trial-piece. Groats and half-groats were not introduced for currency till the 25th Edward III., and continue at present, though not for circulation. A silver fourpenny piece for circulation, of a different type from the ordinary groat, has been issued for circulation by King William IV., A.D. 1836. The groat received its name from the French *gros*, a large piece. In the time of Henry VII. and Henry VIII. groats and half-groats were struck in the archiepiscopal mints of Canterbury and York. It was one of the charges against Wolsey, that he had put the cardinal's hat upon the king's money, as is seen upon his York groats and half-groats.

The testoon, or shilling, was first coined by Henry VII., in 1503. The appellation of testoon was from the *teste* or *tête*, the head of the king, upon it: that of shilling is of old but uncertain origin. Pinkerton says, that coins of that name had been struck at Hamburg in 1407. The scilling was a denomination of money in the Saxon times.

Henry VIII. struck some patterns for a silver crown; but the first crown for currency was struck by Edward VI., with the half-crown, sixpence, and threepence. Queen Elizabeth, in 1558, coined three-halfpenny, and in 1561 three-farthing pieces. Pinkerton says they were dropped in 1582, but there is a three-halfpenny piece in the cabinets of the British Museum, bearing the date of 1599. Charles I. struck twenty-shilling and ten-shilling pieces in silver, but they were of very limited currency.

From the 43rd Elizabeth, 1601, the denominations, weight, and fineness of English silver have remained the same. It is worthy of remark, that, during all his distresses, King Charles I. never debased his coin.

The gold coinage of England is next to the silver in point of antiquity. The gold current with us, till the 41st Henry III., was foreign. In that year, 1257, a manuscript chronicle, in the archives of the city of London, states that the king made a penny of the finest gold, which weighed two sterlings, and willed that it should be current for twentypence. Three specimens of it only are yet known to have reached us; and two out of the three are preserved in the British Museum. They are from different dies. This coin is engraved in Snelling's 'View of the Gold Coin,' in the last edition of Folkes's 'Tables,' and in Pinkerton's 'Essay on Medals.' It is from Edward III. that the series of English gold coin really commences, for no more occurs till 1344, when that prince struck florins. The half and quarter-florin were struck at the same time. The florin was then to go for six shillings, though now it would be intrinsically worth nineteen. This coin being inconvenient, as forming no aliquot part of larger ideal denominations, seems to have been withdrawn. None have yet been found, but a few quarter-florins are preserved in cabinets, and one half-florin is known. In consequence, in the same year, the noble was published, of 6*s*. 8*d*. value, forming half a mark, then the most general ideal form of money. The obverse represents the king standing in a vessel, asserting the dominion of the sea. The noble was also attended by its half and quarter. This coin, sometimes called the rose noble, together with its divisions, continued the only gold coin, till the angels of Edward IV., 1465, stamped with the angel Michael and the dragon, and the angelets or half-angels were substituted in their place. Henry V. is said to have diminished the noble, still making it go for its former value. Henry VI. restored it to its size, and caused it to pass for 10*s*., under the new name of ryal. The ryal of 10*s*. and the angel of 6*s*. 8*d*., with their divisions of half and quarter, then continued the sole gold coins till, in 1485, Henry VII. issued the double ryal, or sovereign, of 20*s*., accompanied by the double sovereign of 40*s*. Henry VIII., in 1527, added to the gold denominations the crown and half-crown, at their present value, and in the same year gave sovereigns of 22*s*. 6*d*, ryals of 11*s*. 3*d*., angels of 7*s*. 6*d*., and nobles at their old value of 6*s*. 8*d*. In 1546 he struck sovereigns of the former value of 20*s*., and half-sovereigns in proportion. Henry VIIIth's gold, like his silver coin, was in the latter part of his reign much debased. Edward VI. coined a treble sovereign: and under James I. the sovereign was called a unite. The former coins however continued, with a few variations, till Charles II. coined the guinea, so called from the Guinea gold, out of which it was first struck in 1663, when it was proclaimed to go for 20*s*., but by tacit and universal consent never went for less than 21*s*. Charles II. likewise issued half-guineas, double guineas, and five-guinea pieces, which his successors, till King George IV., continued. George I. and George III. issued quarter-guineas; and George III. pieces of seven shillings in 1797. In 1815 sovereigns and half-sovereigns, of 20*s*. and 10*s*. each, were again coined, and the guinea and half-guinea were gradually withdrawn from circulation.

With the exception of the styca, the copper coinage of England arose a thousand years later than its silver. Queen Elizabeth had a great aversion to copper money, although the necessities of her people for small change were obvious. She suffered a pattern to be struck as the PLEDGE. OF. A. HALF PENNY, and James I. and Charles I. actually issued farthing tokens also as pledges; but no authorized coinage of copper was struck till 1672, when halfpence and farthings of that metal were first made public money. In 1684 tin farthings were coined, with a stud of copper in the centre. Others, as well as halfpence of the same metal, were struck by James II., and William and Mary. In 1693 the tin was called in, and copper renewed. Pieces of a penny and twopence in copper were coined in the reign of George III. The latter did not answer their purpose, and were soon discontinued. The penny pieces remain in circulation.

Our space will allow us to say less than we could wish upon the money struck in France by English princes. Of Anglo-Gallic silver coins we have deniers of Eleanor, wife of Henry II., as duchess of Aquitaine, with deniers and half-deniers of Henry II., and pennies and half-pennies of Aquitaine, and pence of Poitou and Rouen of Richard I. Of John and Henry III. we know of no Anglo-French money; but there is a lion of billon of Edward I., coined during the lifetime of his father after he had received Gascony, and a plentiful series of silver and billon coins of Edward III., of Edward the Black Prince, of Richard II., Henry IV., V. and VI. The denominations of the silver were the hardi, double hardi, groat, half-groat, penny and half-penny. In this class also fall the Calais groats and half-groats of the sovereigns of England, from Edward III. to Henry VI., and the Tournay groats of Henry VIII. Edward III. was the first of the English princes who struck gold money in France; the denominations were guiennois, leopard, chaise, and mouton; to these Edward the Black Prince added the hardi of gold and the pavilion; and Henry V. salutes and half-salutes. Henry VI. coined salutes, angelots, and francs in gold. The equivocal specimen of silver coin, supposed to have been struck by Margaret of Burgundy for Perkin Warbeck, is usually classed with the Anglo-Gallic series.

In respect to numismatic writers, we can only enumerate a few of the most important upon the various series of coins. On the Greek and Roman series, the best works are Eckhel's 'Doctrina Numorum Veterum,' Rasche's 'Lexicon Universæ Rei Numariæ,' and Mionnet's 'Description de Medailles Antiques Grecques et Romaines:' the last work in 5 vols., 8vo., with 7 vols. of Supplement, Paris, 1806-35. For the Roman alone, the reader may consult A. Morel's 'Thesaurus Familiarum Romanarum,' 2 tom fol., Amsterdam, 1734; and his 'Thesaurus Numismatum Imperatorum,' 3 tom., Amsterdam, 1752. Another which brings the Roman series to the close of the empire, will be found in Banduri's 'Numismata Imperatorum Romanorum a Trajano Decio ad Palæologos Augustos,' 2 tom., Lut. Par., 1718, with Tanini's 'Supplement,' in 1 vol., fol., Rome, 1791. See also Mionnet's work, in 2 vols., 'De la Rareté et du Prix des Medailles Romaines,' 8vo., Paris, 1827 The prices of the different coins, fixed according to their rarity, in this work are now the guide to the coin-dealers and collectors throughout Europe. To the English reader, Captain W. H. Smyth's 'Descriptive Catalogue of a Cabinet of Roman Imperial Large Brass Medals,' 4to., Bedford, 1834; and Akerman's 'Descriptive Catalogue of Rare and Unedited Roman Coins,' 2 vols., 8vo., London, 1834, will be especially useful. Pinkerton's 'Essay on Medals,' 2 vols., 8vo., 1789, with all its errors, is valuable as a general elementary treatise.

Bayer's work, 'De Numis Hebræo-Samaritanis,' 4to., 1781; and his 'Numorum Hebræo-Samaritanorum Vindiciæ,' 4to., 1790, are valuable works upon the Jewish coins.

On English coins, the best works are Leake's 'Historical Account of English Money,' 8vo., London, 1745; Snelling's various works; Folkes's 'Tables of English Coins,' as published by the Society of Antiquaries; and Ruding's 'Annals of the Coinage of Britain.' Simon has written an 'Essay towards an Historical Account of Irish Coins;' and Cardonnel his 'Numismata Scotiæ, or a Series of the Scottish Coinage.' On Anglo-Gallic coins, we have a quarto volume by Ducarel; a volume of similar size, 'A Description of the Anglo-Gallic Coins in the British Museum;' and 'Illustrations of the Anglo-French Coinage,' by Major-Gen. Ainslie, 4to., London, 1830; the last, and a very valuable publication.

On the French coinage, we have the works of Bouteroue and Le Clerc; on the Papal coins, Floravante. Argelati and Zanetti have written on the coins of Italy; and Florez on those of Spain. For the coins of Germany, the reader may consult Madai's 'Thaler-Cabinet,' 4 tom., Königsberg, 1765-8; and Weise's 'Gulden-Cabinet,' 2 tom., Nurnberg, 1780-2. For Danish coins, the 'Danske Mynter og Medailler,' 3 tom., fol., Copenh., 1791-4. On Bulgarian coins Fraehn's work, 4to., Casan, 1816. For Oriental coins, Marsden's 'Numismata Orientalia Illustrata,' 2 vols., 4to., London, 1823-5.

COINING. [Mint.]

COINING. The numerous and complicated laws upon this subject, passed from time to time during several centuries, as occasion called for penal enactments to protect the coin of the realm, were repealed by the recent stat. 2 Will. IV. c. 34. The making or coining of money being one of the exclusive prerogatives of the crown, the counterfeiting of the king's coin was in early periods of the history of English law considered to be a usurpation upon the royal authority, and upon that principle constituted the offence of high treason both by the common law and by various statutes. By the late stat., 2 Will. IV., c. 34, s. 3 it is enacted, with respect to gold and silver coin, That any person falsely making or counterfeiting any coin resembling, or apparently intended to resemble or pass for, the king's current gold or silver coin, shall be liable to transportation for life, or any term not less than seven years, or to imprisonment for any term not exceeding four years. The 4th section of the act imposes the same punishment upon the offences of colouring, washing, or casing over any metal or counterfeit coin so as to pass for the genuine gold and silver coin of the realm; and of filing, washing, or otherwise altering silver coin so as to pass for gold, or copper coin so as to pass for silver or gold. By the 5th section persons impairing, diminishing, or lightening the king's current gold or silver coin, with intent to make it pass for the king's current gold and silver coin, are made liable to transportation for fourteen years, or imprisonment for three years.

By the 6th section of the statute it is enacted, That if any person shall buy, sell, receive, pay or put off, any false or counterfeit coin resembling, or apparently intended to resemble or pass for, any of the king's current gold or silver coin, or offer so to do, at or for a lower rate or value than the same by its denomination imports; or if any person shall import into the United Kingdom, from beyond the seas, any false or counterfeit coin resembling, or apparently intended to resemble or pass for, any of the king's current gold or silver coin, knowing the same to be false or counterfeit, he shall be liable to be transported for life, or for any term not less than seven years, or to be imprisoned for any term not exceeding four years.

By the 7th section it is enacted, That if any person shall tender, utter, or put off any false or counterfeit coin, resembling, or apparently intended to resemble or pass for, any of the king's current gold or silver coin, knowing the same to be false or counterfeit, he shall be liable to imprisonment for any term not exceeding one year; and if any person shall tender, utter, or put off any false or counterfeit coin resembling, or apparently intended to resemble or pass for, any of the king's current gold or silver coin, knowing the same to be false or counterfeit, and such person shall, at the time of such tendering, uttering, or putting off, have in his possession, besides the false or counterfeit coin so tendered, uttered, or put off, one or more piece or pieces of false or counterfeit coin resembling, or apparently intended to resemble or pass for, any of the king's current gold or silver coin, or shall, either on the day of such tendering, uttering, or putting off, or within the space of ten days then next ensuing, tender, utter, or put off any more or other false or counterfeit coin resembling, or apparently intended to resemble or pass for, any of the king's current gold or silver coin, knowing the same to be false or counterfeit, he shall be liable to imprisonment for any term not exceeding two years. And it is further declared by the same section, that if any person who shall have been convicted of any of the offences thereinbefore mentioned, shall afterwards commit any of such offences, he shall be liable to be transported for life, or for any term not less than seven years, or to be imprisoned for any term not exceeding four years.

The 8th section of the statute enacts, That if any person shall have in his custody or possession three or more pieces of false or counterfeit coin resembling, or apparently intended to resemble or pass for, any of the king's current gold or silver coin, knowing the same to be false or counterfeit, and with intent to utter or put off the same, he shall be liable to be imprisoned for any term not exceeding three years; and if any person so convicted shall afterwards commit the like misdemeanor, or crime and offence, he shall be liable to be transported for life, or for any term not less than seven years, or to be imprisoned for any term not exceeding four years.

The provisions above abstracted relate to the protection of the gold and silver coin: by the 12th section of the same statute the following provisions have been made with respect to copper coin. It is by that section declared, that if any person shall falsely make or counterfeit any coin resembling, or apparently intended to resemble or pass for, any of the king's current copper coin; or if any person shall knowingly, and without lawful authority (the proof of which

authority shall lie on the party accused), have in his custody or possession any instrument, tool, or engine adapted and intended for the counterfeiting any of the king's current copper coin; or if any person shall buy, sell, receive, pay, or put off, or offer to buy, sell, receive, pay, or put off, any false or counterfeit coin resembling, or apparently intended to resemble or pass for, any of the king's current copper coin, at or for a lower rate or value than the same by its denomination imports; every such offender shall be liable to be transported for any term not exceeding seven years, or to be imprisoned for any term not exceeding two years; and if any person shall tender, utter, or put off any false or counterfeit coin resembling, or apparently intended to resemble or pass for, any of the king's current copper coin, knowing the same to be false or counterfeit, or shall have in his custody or possession three or more pieces of false or counterfeit coin resembling, or apparently intended to resemble or pass for, any of the king's current copper coin, knowing the same to be false or counterfeit, and with intent to utter or put off the same, every such offender shall be liable to be imprisoned for any term not exceeding two years.

The 10th section of the act contains the following provision against making, mending, or having in possession any coining tools. It enacts, that if any person shall knowingly, and without lawful authority (the proof of which authority shall lie on the party accused), make or mend, or begin to proceed to make or mend, or buy or sell, or shall knowingly and without lawful excuse (the proof of which excuse shall lie on the party accused) have in his custody or possession any puncheon, counter-puncheon, matrix, stamp, die, pattern, or mould, in or upon which there shall be made or impressed, or which will make or impress, or which shall be intended to make or impress, the figure, stamp, or apparent resemblance of both or either of the sides of any of the king's current gold or silver coin, or any part or parts of both or either of such sides; or if any person shall, without lawful authority (the proof whereof shall lie on the party accused), make or mend, or begin or proceed to make or mend, or buy or sell, or shall, without lawful excuse (the proof whereof shall lie on the party accused), have in his custody or possession any edger, edging tool, collar, instrument, or engine, adapted and intended for the marking of coin round the edges with letters, grainings, or other marks or figures apparently resembling those on the edges of any of the king's current gold or silver coin, such person knowing the same to be so adapted and intended as aforesaid; or if any person shall, without lawful authority, to be proved as aforesaid, make or mend, or begin or proceed to make or mend, or buy or sell or shall without lawful excuse, to be proved as aforesaid, have in his custody or possession any press for coining, or any cutting engine for cutting by force of a screw, or of any other contrivance, round blanks out of gold, silver, or other metal, such person knowing such press to be a press for coinage, or knowing such engine to have been used, or to be intended to be used, for the counterfeiting of any of the king's current gold or silver coin, every such offender shall be liable to be transported beyond the seas for life, or for any term not less than seven years, or to be imprisoned for any term not exceeding four years.

COIRE. [GRISONS.]

COKE, EDWARD,* was born at Mileham, in the county of Norfolk, on the 1st of February, 1551-2. He was the only son of Robert Coke of Mileham, and Winifred, daughter and one of the heirs of William Knightley, of Morgrave-Knightley, in the same county. His father, who was a bencher of Lincoln s Inn, died in the year 1561, when Edward Coke was ten years old. Before that event he had been sent to the Free Grammar School at Norwich, whence, in September, 1567, he removed to Cambridge, and was admitted as a fellow commoner at Trinity College. After having spent three years at the University he went to London to commence his legal education. According to the practice of that time, he took the first step of his legal course by becoming a member of Clifford's Inn, a house of Chancery, or inferior inn, dependent upon the Inner Temple, and was admitted into the latter society April 24, 1572. On the 20th of April, 1578, he was called to the bar. During the continuance of his studies in the Inner Temple, he is said to have greatly distinguished himself in the exercises called Mootings and Readings, which constituted a necessary part of the education of an advocate in former times, and which excited a great degree of interest and emulation among the members of the societies called Inns of Court and Chancery.

In the course of the year after his call to the bar, the society of the Inner Temple appointed him reader at Lyon's Inn; and the intelligence and learning displayed by him, in the conduct of the exercises at which he presided in this capacity, raised for him a high reputation as a lawyer, and opened the way to that extensive practice at the bar, which he acquired with a degree of rapidity almost without a parallel in the history of the profession. Lloyd, in his 'State Worthies,' says that 'his learned lecture so spread forth his fame that crowds of clients sued to him for his counsel.' In the next term after he was called to the bar he argued a case of much nicety and importance, known to lawyers by the name of Lord Cromwell's Case, which he says, in his own report of it (4 Rep. 146), 'was the first cause that he moved in the King's Bench.' About three years afterwards he was associated with Popham, the solicitor-general, in arguing before the chancellor and the twelve judges in the case of Edward Shelley, where the important rule in the law of real property, which has since become celebrated as the 'Rule in Shelley's Case,' was laid down so distinctly that it has taken its name from this case, though the rule itself is of much higher antiquity. From that period until he became solicitor-general, his practice was enormous: it appears from the reports of that time that there was scarcely a single motion or argument before the court of King's Bench in which he was not engaged. Professional honours were the consequence of this large business in the courts; in 1586 he was chosen recorder of Norwich, and for years afterwards was called to the bench of the Inner Temple. In January, 1591-2, the corporation of London having with much difficulty and at the expense of an annuity of 100*l*. procured the resignation of Serjeant Fleetwood, unanimously elected Coke their recorder; but he resigned that office in June, 1592, on being appointed solicitor-general. In the same summer he became reader of the Inner Temple, and had delivered several readings on the Statute of Uses to a large audience, consisting of not less than 160 members of the society, when the appearance of the plague compelled him to leave London abruptly for his house at Huntingfield in Suffolk. Such was the honour and respect in which he was held by the profession, that on this occasion, as he records in his Notes, he was accompanied on his journey as far as Romford by a procession composed of nine benchers and forty other members of the Inner Temple. In March, 1594, he was appointed attorney-general, and as the office of solicitor continued vacant until the close of the following year, the duties and labours of both offices during that interval devolved upon him.

At this period originated the animosity between Coke and Bacon, which prevailed with little intermission during the life of the latter. As soon as the office of attorney-general became vacant, upon the removal of Sir Thomas Egerton to the seals, the earl of Essex used his most strenuous efforts to induce the queen to bestow that place upon Bacon, instead of promoting Sir Edward Coke from the inferior office of solicitor-general. The letters of Bacon to Essex and others, with relation to this intrigue, abound with sarcastic and contemptuous expressions respecting Coke, whose high reputation and great experience pointed him out as at all events a fitter man for the office than his rival, whose practice at the bar was never extensive, and who was then scarcely known in the courts.*

The state services imposed upon the attorney-general at the end of Elizabeth's reign were extremely laborious. The severity of the laws recently introduced against Roman Catholics had occasioned a succession of plots by foreign adventurers against the person of the queen, the investigation of which was necessarily committed to the attorney-

* Many of the dates and incidents in this sketch of Sir E. Coke's life are taken from some characteristic memoranda in his own hand-writing prefixed to a volume of Notes among the Harleian MSS. in the British Museum, No. 6687. This was probably the book which Lloyd mentions in his 'State Worthies' as 'a manual which Coke called *vade mecum*, from whence at one view he took a prospect of his past life, having noted therein most remarkables.' Roger Coke, in his 'Detection of the Reign of King Charles,' says, that when Sir E. Coke was on his deathbed, a king's messenger seized all his books and papers, and among them his 'Comment on Littleton, and the History of his Life before it, written with his own hand.' These notices seem to describe the identical book which has now found its way into the British Museum. It is remarkable that these notes have not been referred to by any of Coke's numerous biographers.

* Bacon, in a letter to Lord Burleigh, alludes to the objection made by the queen to his appointment, on the ground that he was 'rather a man of study than of practice and experience.' (*Cabala*, p. 17.)

general. The treasons of Lopez, of Patrick Cullen, of Williams and Yorke, and numerous others of inferior moment, occurred about this period: and the business of constant examination at the Tower, added to his Star Chamber duties and his undiminished practice in the common-law courts, must have imposed a weight of labour and responsibility upon Coke which no mind of common activity and energy could have undergone. Whole volumes of examinations in these cases, taken by himself and written with his own hand, which are still preserved at the State Paper Office, sufficiently attest his zeal and assiduity in the service. In February, 1593, Coke, being at that time solicitor-general, was elected a member of parliament for his native county of Norfolk. In his own memorandum of this circumstance he says, that the election was 'unanimous, free, and spontaneous, without any canvassing or solicitation on his part.' At the meeting of this parliament he was chosen speaker of the House of Commons.

In the year 1582 Coke married the daughter and heiress of John Paston, Esq., of Huntingfield, in Suffolk, through whom he became connected with several families of great opulence and importance, and with whom he received a fortune of 30,000*l*. By this lady he had ten children. She died in June, 1598. In the month of November in the same year Coke contracted a second marriage with the widow of Sir William Hatton, daughter of Thomas Lord Burleigh, and grand-daughter of the lord high treasurer, which, though an advantageous alliance in point of connection and property, was by no means a source of domestic happiness. The marriage itself involved all the parties concerned in it in considerable embarrassment: for having taken place without licence or banns, Coke and his lady, together with the clergyman, Lord Burleigh, and all who were present at the ceremony, were cited to appear in the Archbishop's Court; and it was only in consequence of their making a full submission, and pleading their ignorance of the law (a singular excuse in Coke's mouth), that they escaped the sentence and penalties of excommunication.

Sir Edward Coke held the office of attorney-general until the death of Queen Elizabeth; and having always been favourable to the title of James I., cooperated cordially with Cecil and the other members of the late queen's council in making the necessary arrangements for the peaceable accession of the king of Scotland to the crown. James, upon his arrival in London, received him into his full confidence and favour, and continued him in his office of attorney-general.

Coke's sound judgment and extensive legal knowledge, united with his fervent attachment to Protestantism, rendered him a valuable officer of the crown in the various proceedings against the Roman Catholics at the close of Elizabeth's reign, and the beginning of that of James I. In the examinations respecting the several assassination-treasons, which have been already mentioned, as well as that of Squire in 1598, of the Raleigh conspiracy in 1603, of the Gunpowder Plot in 1605, and of numerous other treasonable and seditious movements imputed to the Catholics during the period that he filled the office of attorney-general, he engaged with a zeal and ardour far beyond mere professional excitement; and the temper displayed in his speeches and general conduct on the several trials is much more that of a religious partisan than of a legal advocate. It is common with Catholic writers to attribute to him the utmost barbarity in the use of the rack and the general treatment of prisoners under examination. That he, who in his writings forcibly condemns the use of torture, was nevertheless in his official character the constant instrument of the crown for applying this odious process, is beyond all question: but it must be remembered that what he wrote on this subject was written long after the period of which we are now speaking, in the dawn of a better order of things; and that the use of the rack for discovering state secrets was common throughout Europe in his time, and had been in daily practice in England for centuries before he was born. There is no satisfactory proof that he was coarse and cruel in his conduct towards prisoners under examination, and on the contrary, Father Cornelius, the Jesuit, who was repeatedly examined by Coke, said he found him 'omnium hominum humanissimus;' and Garnet, in his intercepted correspondence, and also on his trial, admits that he was constantly treated by him with courtesy and kindness.

There is no doubt however that as the advocate of the crown on trials for state offences, he displayed a degree of intemperance and asperity not only shocking to the feelings of readers familiar only with the more civilized character of criminal proceedings at the present day, but strongly offensive even to contemporaries.

With the trials of the conspirators in the Gunpowder Plot in 1606, the career of Sir Edward Coke as an advocate closed. In the month of June in that year he received his appointment as chief justice of the Common Pleas. He retained the situation upwards of seven years; and in the discharge of the common judicial duties at this period, his profound learning and unwearied industry procured him the highest reputation. At this time too, though he has sometimes been reproached for a haughty and unconciliating deportment on the bench, the bitterness of temper which he had displayed at the bar appears to have been suppressed or softened; and in several constitutional questions of the highest importance which occurred while he was chief justice of the Common Pleas, and in which he resolutely opposed the views of the king, especially in the conflicts between the ecclesiastical jurisdictions and the courts of common law, and in his resistance to the encroachment of prerogative on the subject of royal proclamations, he displayed great integrity and independence. With a view to corrupt his uncompromising disposition, his crafty rival, Bacon, who was then solicitor-general, suggested his promotion to the chief-justiceship of the King's Bench; and accordingly he received his patent for that office in October, 1613, and a few days afterwards, in consequence of a special order from the king, took his seat at the board as a privy councillor. In the following year he was elected high steward of the University of Cambridge.

The project of making the chief justice 'turn obsequious' by his advancement, which was no doubt entertained by the court, and was expressly avowed by Bacon, altogether failed. In the case of Peacham, who was prosecuted for treason in the year 1615, for having in his possession a sermon supposed to contain sedition, written by him, but never preached or published, Coke, after long hesitation to deliver what he quaintly called an 'auricular opinion,' seems at last to have declared that the offence was not treason. His exertions in the prosecution of the murderers of Sir Thomas Overbury in the same year, though praised by Bacon in conducting the case as attorney-general, gave displeasure to the king; and his independent conduct in the case of Commendams, which occurred in 1616, finally determined the court to remove him from his office. The transaction was this. A serjeant-at-law, in the discharge of his duty as an advocate in the Court of Common Pleas, was supposed to have used matter in his argument which tended to question the royal prerogative; upon this the king required the judges to proceed no further in the case without his warrant. The twelve judges conferred upon this message, and resolved that in a common dispute between party and party it was their duty to proceed notwithstanding the king's mandate. Upon this they were summoned to the council table, and personally reprimanded by the king; and all of them, excepting the lord chief justice, acknowledged their error, and craved pardon for their offence upon their knees. Sir Edward Coke, on the contrary, after craving pardon for any formal errors which he might have committed, boldly justified his opinion upon the substantial point, contending that the king's command for staying the proceedings was a delay of justice, and consequently against the law, and contrary to the judges' oath. After much discussion, the lords of the council proposed the following question to the judges:—'Whether in a case where the king believed his prerogative or interest concerned, and required the judges to attend him for advice, they ought not to stay proceedings till his Majesty had consulted them?' All the judges at once answered in the affirmative, except Lord Coke, who only said 'that, when the case happened, he would do that which should become an honest and just judge.'

The court now despaired of bending the stubborn integrity of the chief justice, and determined at all events to displace him. Accordingly, on the 26th June, 1616, as a preliminary to his removal, he was summoned before the council, and charged with several frivolous accusations, some of them founded upon alleged malversations while he was attorney-general, to all of which he returned distinct answers. Four days afterwards, he was again summoned to appear before the council; upon which occasion he was

reprimanded, sequestered from the council-table during the king's pleasure, enjoined not to ride the summer circuit as judge of assize, and ordered to employ his leisure in revising many 'extravagant and exorbitant opinions' set down in his Book of Reports. In the course of the vacation he was again summoned before the council to answer a list of twenty-eight objections to doctrines contained in his Reports, which a contemporary writer observes, 'were either so weak in themselves, or so well answered, that they were readily reduced to five.' (Chamberlain's *Letter to Sir D. Carleton*, 26th Oct., 1616.) In November, 1616, he received his writ of discharge from the office of chief justice: and was succeeded by Sir Henry Montague, who was expressly warned by the lord-chancellor Egerton 'to avoid the faults of his predecessor, who had been removed for his excessive popularity.'

From causes not very distinctly explained in the letters and histories of the day, which probably were connected with an intrigue for the marriage of his daughter to Sir John Villiers, afterwards Viscount Purbeck, Sir Edward Coke, though he never afterwards filled a judicial situation, was, at no long interval, restored to a certain degree of royal favour. In September, 1617, he was reinstated as a member of the privy council, and in July, 1618, he was appointed a 'commissioner for the exercising the office of lord high treasurer of England,' jointly with archbishop Abbott, lord-chancellor Bacon, and several others. (See Devon's *Pell Records*, temp. Jac. I.) In the course of the next three years he was employed in several other commissions of a public nature, and until the year 1620 he was constant in his attendance at the board. In the parliament which assembled in that year he was returned as a member for the borough of Liskeard in Cornwall. In this parliament he distinguished himself as one of the most able and zealous advocates of the liberal measures which were proposed; he became a strenuous opponent of the pernicious monopolies by which at that period the freedom of trade was fettered, and took an animated part in that struggle between the prerogative pretensions of James and the freedom of debate, which ended in the celebrated resolution of the Commons, 'that the liberties, franchises, privileges, and jurisdictions of parliament are the antient and undoubted birth-right and inheritance of the subjects of England.' During the year 1621, he attended only three times at the privy council; and on one of those occasions, namely on the 5th Oct., 1621, he seems to have appeared only to inform the board that he had induced one Johnstone to give up a grant which he had obtained from the king, as 'both a grievance to the subject, and a disservice to the state;' which information he desired might be recorded in the council register. (*Council Books.*) His adherence to the popular or *country* party gave great offence to the court, and he was accused of various offences and malpractices. The king, at this period, was so incensed against him, that before he would grant his warrant for a general pardon, at the end of 1621, he expressly commanded the privy council to consult upon the means of excepting Sir Edward Coke from the benefit of it; and on the 27th of December of that year, Coke was arrested and committed to the Tower, where he remained a close prisoner until the 6th of August, 1622. While he was in the Tower, proceedings were instituted against him both in the star-chamber and the court of wards, the precise nature and issue of which cannot now be ascertained. Upon his enlargement from the Tower, he was ordered to confine himself to his house at Stoke Pogis, and not to repair to the court without express licence from the king. After his disgrace on this occasion, he was never again restored to the council-board. At the end of 1623 he was appointed a commissioner, together with Sir William Jones, one of the judges of the Common Pleas, and two other persons, to inquire into the church establishment in Ireland. That he was on the point of going on this mission appears from the fact that a passport dated 16th January, 1623-4, was actually granted by the council. Some accident however prevented his departure.

In the first parliament of Charles I., called in April, 1625, Sir E. Coke was again returned as one of the knights of the shire for the county of Norfolk, as he says in his Note, 'sine aliquâ motione aut petitione inde a me prœbitis.' At the commencement of this parliament he adopted a moderate tone. He dissuaded the house from insisting upon grievances, and urged conciliatory measures; saying, that 'as it was the very beginning of the new king's reign, there could be no grievances as yet.' But this disposition to peace was overcome by the determined tendency of the crown to arbitrary measures; and the king being unable to obtain any answer to his demand of a subsidy, but repeated remonstrances against grievances, abruptly dissolved the parliament. He was compelled, however, by his pecuniary wants, to assemble a new parliament in the course of the same year, having previously appointed Sir Edward Coke and three other popular leaders sheriffs of counties, in order to prevent their serving as members. Coke, having been in this manner named Sheriff of Buckinghamshire, was again returned as knight of the shire for Norfolk; and though in consequence of his shrievalty, he did not take his seat in that parliament, no new writ was issued to supply his place, and it was considered that he was *de facto* a member of the house. He mentions this circumstance in his 'Fourth Institute,' p. 48, though he does not state it to have been his own case; and says, that 'having a subpœna out of chancery served upon him, he had his privilege of parliament allowed unto him by the judgment of the whole House of Commons.' On occasion of the third parliament summoned by Charles I. in March, 1628, Sir Edward Coke was returned for two counties, Buckingham and Suffolk; but he tells us that 'he chose the former, because he resided there, and because his election for that county took place first.' In this parliament, though now in his 79th year, this extraordinary man asserted and defended the constitutional rights of the people of England with all the energy of youth, and all the sagacity of age. By his advice, and with his active cooperation and assistance, which his extensive and varied experience rendered particularly valuable, the celebrated Bill of Rights was framed; and by his perseverance and reasoning the lords were, after many conferences, induced to concur in the measure, which was, at last, and after many ineffectual attempts at evasion, reluctantly assented to by the king. One of the last acts of his public life was his spirited denunciation of the Duke of Buckingham as the cause of all the misfortunes of the country. As a proof of the earnest feelings by which he was impressed, Rushworth records that, on this occasion, 'Sir Edward Coke, overcome with passion, seeing the desolation likely to ensue, was forced to sit down when he began to speak, through the abundance of tears.' At the close of the session of parliament in March 1629, the growing infirmities of advanced age induced him to withdraw from public life, and to spend the remainder of his days in retirement on his estate at Stoke Pogis, in Buckinghamshire. Still it appears that his vigorous and active mind was not without employment; and the last years of his life are said to have been occupied by the revision of the numerous works which he left behind him.

The last entry in his note-book, written with almost as firm a hand as he wrote at the age of 40, records the following incident, which may possibly have been the cause of his death:—

'Memorandum. Die Jovis, the iii[rd] of May, 1632, riding in the morning in Stoke, between eight and nine of the clocke to take the ayre, my horse under me had a strange stumble backward, and fell upon me (being above 80 years old), where my head lighted nere to sharpe stubbes, and the heavy horse upon me. And yet, by the providence of Almighty God, though I was in the greatest danger, yet I had not the least hurt,—nay, no hurt at all. For Almighty God saith by his prophet David, "The angel of the Lord tarrieth round about them that feare him, and delivereth them." Et nomen Domini benedictum, for it was his work!'

He died on the 3rd of September, in the following year, repeating with his last breath the words, 'Thy kingdom come, thy will be done;' and was buried in the family burying-place of the Coke family in the church of Titeshall, in Norfolk.

The most celebrated of Sir Edward Coke's works is the treatise commonly known by the name of 'Coke upon Littleton, or the First Institute.' It consists of a minute and laborious commentary upon the text of Littleton's 'Tenures,' in the course of which almost the whole learning of the common law, as it existed in his time, is digested and explained. This book has, ever since the time of Lord Coke to the present day, been considered as a work of the highest authority in the municipal and constitutional law of England. The 'Second Institute' contains notes on several

antient statutes; the 'Third Institute' is a treatise on criminal law; and the 'Fourth Institute' treats of the origin and jurisdiction of different courts. Besides these works, Sir Edward Coke was the author of a treatise on copyholds, entitled 'The Complete Copyholder,' and a 'Reading on Fines.' He also published a collection of Reports, which are still of great value to the profession; and at the time of their appearance formed an epoch in the history of the law. Sir Francis Bacon speaks of this produce of the industry and learning of his great rival in terms of high and deserved commendation; and justly ascribes to the Reports the praise of having preserved the vessel of the common law in a steady and consistent course; 'For the law,' says he, 'by this time had been like a ship without ballast, for that the cases of modern experience are fled from those that are adjudged and ruled in former time.'

COL, COLLE, from the Latin *collis*, 'a hill or ascent,' is a name given in Italian, and in the dialects of the Italian and Romanæ languages, to several mountains in the Alps and Apennines over which there is a road or pass. The name is applied both to the pass itself, and to the mountain. The principal Cols are the Col de la Seigne and Col de Bonhomme, in the Pennine Alps south of Mont Blanc; the Col de Balme and Col Ferret in the same chain north of Mont Blanc, the latter adjoining the St. Bernard; the Col d'Argentiere in the Maritime Alps south of Mount Viso, and over which is a pass for mules leading from the valley of Barcelonette in France into the valley of the Stura in Piedmont. A branch of the antient Via Æmilia led over this pass, which is one of the most direct from France into Piedmont, and has been repeatedly used by the French in their invasions of Italy. The Col di Tende lies between Piedmont and the county of Nice, on the road from Turin to the latter town, which is the only carriage-road over the Maritime Alps. [ALPS.] The term Col implies a depression in the mountain, however high, which affords a natural pass; for instance, in the great ridge adjoining Mont Blanc, which divides the valley of Chamouny from that of Aosta, there is a lofty needle or summit, called Le Géant, 'the Giant,' which is above 13,000 feet high. By the side of this great pyramid, and between it and Mont Blanc, there is a considerable depression, called Le Col du Géant, which affords in summer a practicable, though dangerous communication between Chamouny and Cormayeur in the Val d'Aosta. The highest part of the Col du Géant is about 10,000 feet. This pass was first tried in the last century by a guide of Chamouny, called Michel Cachat, who ever after was called Le Géant; it was afterwards passed by Saussure, Bourrit, and others.

There are several passes in the Apennines called by the name of Col: one of the most known is Col Fiorito, on the road from Rome to Loreto and Ancona. There are also several towns in Italy, especially in Tuscany, called Colle, from being built on some hill.

In Catalonia also, where a dialect of the Romanæ language is spoken, the appellation of Col is applied to mountain-passes, such as Col de Creu, near Vich, and Col de Balaguer, near the town of that name.

COLAPORE, a small independent Mahratta state, situated within the province of Bejapore, in the region of the Western Ghaut mountains, being partly below and partly within the Ghauts. The territory of the Colapore rajah is so intermixed with that of the British and of other Mahratta chiefs, that it would be difficult to describe its boundaries. [BEJAPORE.] The state of Colapore was founded by Sumbajee, the grandson of Sevajee. In 1728 Sumbajee was confederated with the Nizam, and accompanied his army to Poona; and in 1731 a treaty was concluded between the Peishwa and Sumbajee, by which it was agreed that the lands of the province lying north of the Kistna should belong to the Peishwa, that all between the Kistna and Warna and the Toombuddra should belong to Sumbajee, and that all conquests south of the Toombuddra should be divided equally between them. The territory thus assigned to the rajah of Colapore was then partly in the actual possession of the Moguls, and partly of other chiefs, called Dessyes, who had set up for themselves. It was not until the subsequent reign of Madhoo Rao, about the year 1762, that the whole was effectually brought under the rajah's power. The Colapore territory became after this the constant scene of war and turbulence, and a place of refuge for all the plunderers and pirates of neighbouring countries. In 1804 the rajah was at war with the Peishwa, and after a long struggle, in which the latter succeeded in capturing the chief places in the state, and in reducing the rajah's government nearly to the point of extinction, the British government interfered for the establishment of peace, and procured the restitution of his towns. This occurred in 1812, after which the state of Colapore enjoyed a long continuance of tranquillity from without. In 1821 the rajah was privately assassinated in his palace, and was succeeded by a son of immature age, during whose long minority the country fell into a state of great disorder; the strong holds in the Ghauts were held by petty chiefs, who rebelled against the superior authority of the rajah, and the state of disorganization became such as to call for a report to the English government from the political agent in the Deccan, in which it was stated that 'robberies and other outrages are frequent in all parts of the Colapore country; and when one occurs, no person ever seems to be near the spot whose business it is to prevent the offence, or to secure the offender. After many delays a case of robbery sometimes finds its way to the rajah's ears, and if he happens to be struck with its enormity, he orders out the Tuppasnuves with a body of horse and foot to hunt the perpetrators. The party after scouring the country, and probably becoming as great a nuisance as the thieves themselves, return to Colapore, and report that it arrived too late to trace them. Under such misrule the potails, who should be here what the justices of the peace are in England, become the abettors of rogues instead of their terror, and the officers of police become thieves instead of thief-takers.' The young rajah on taking the government into his own hands proved to be of an arbitrary disposition, and early lost the good esteem of his subjects by his exactions and his degrading vices. In 1825, 1826, and 1827, the rajah having committed aggressions in the territories of some Mahratta Jagheerdars under the protection of the English, his territory was occupied by our troops, and the powers of government were temporarily placed in the hands of a minister appointed by the governor of Bombay. In each of the years just mentioned a treaty was concluded with the rajah, by which he bound himself to desist from acts of aggression; but these treaties having been forced upon him, their provisions were broken upon every occasion that presented itself, and in 1829 a definitive treaty restricted him from keeping up a greater force than 400 horse and 800 foot soldiers: some districts in which he had committed oppressions against the Zamindars were at this time taken from him; British garrisons were placed in the capital and in the fortress of Punnalaghur at the rajah's expense, and a chief minister for the future management of his government was to be permanently appointed by, and removable solely at the pleasure of the English government.

(*Selection of unpublished papers, from the records of the East India House: Report of Committee of House of Commons on the Affairs of India*, 1832—*political section*).

COLAPORE, the capital of the state just described, is situated in 16° 19′ N. lat. and 74° 25′ E. long., in a valley between a curved range of hills, by which it is protected on three sides, the fourth side being protected by two hill-forts about ten miles north-west from the town. These forts stand upon rocks which are about 300 feet above the level of the valley, and which present natural perpendicular ramparts of basalt, from thirty to sixty feet high. The two forts are connected together; one of them, called Penowlghur, covers a space three and a half miles in circumference, in which area are several dwellings, lofty trees, gardens, and fine tanks. The works immediately connected with the town of Colapore are not strong. The town is 120 miles south of Poona.

COLAPTES. [PICIDÆ.]

CO'LARIS. [EURYSTOMIDÆ.]

COLBERG, a town and strong fortress in the administrative circle of Cöslin, in the Prussian province of Pomerania, about 170 miles north-east of Berlin, and in 54° 9′ N. lat., 15° 34′ E. long. It is on the right bank of the Persante, which empties itself into the Baltic about a mile below the town, and at its mouth forms a harbour, called the Münde; which properly consists of two dams, carried out from the banks of the river into the sea, and protected by redoubts. Colberg contains 720 houses and 5900 inhabitants, five Lutheran churches, five hospitals, a workhouse, a house of correction, an exchange, a foundation in a nunnery for seven daughters of noble families, and nine of citizens; an orphan asylum, a gymnasium, &c. Colberg has

a salmon, haddock, and lamprey fishery; manufactures of woollens, anchors, and brandy; also salt-works, which however do not yield above 1620 tons annually. The absence of fresh-water springs is supplied by admirable but very expensive water-works: the water, which is raised by a wheel to the height of forty feet, is conveyed in pipes to every part of the town.

Colberg was formerly one of the Hanse towns, and till 1812 the seat of a collegiate chapter. The modern fortifications and outworks were commenced in 1773. It was taken after a siege of several weeks by Gustavus Adolphus, in 1630; was besieged by the Russians in 1758, 1760, and 1761, and surrendered to them by capitulation on the 16th December, in the last-mentioned year. The French invested it without success in 1817. It has a considerable trade, both inland and foreign, and a brisk woollen market. Its military strength is greatly increased by the swampy nature of the country around it.

COLBE'RT, JEAN BAPTISTE, born in 1619, at Rheims, was brought up to business. He was first employed at Lyon, in a commercial house, and afterwards went to Paris, where he was introduced, about 1648, to Mazarin. (Grosley's *Mémoires*.) Mazarin employed him first as an amanuensis, but afterwards made him intendant or steward of his vast fortune. He appointed him his executor on his death-bed in 1661, and recommended him to the king as a man deserving all his confidence. Louis XIV., on appointing Colbert contrôleur-général des finances, had many conferences with him, which led to the dismissal and imprisonment of Fouquet, the superintendent of the finances, who had assisted in dilapidating the resources of the state to serve the cupidity of Mazarin. On the trial there was a manifest anxiety on the part of the court and of Colbert to have Fouquet condemned to death, but D'Ormesson, one of the reporting judges, stood firm; he found much abuse and mal-administration, but no proof of peculation. Fouquet was condemned to banishment, and his property was confiscated. Louis XIV. aggravated this sentence into imprisonment for life in the citadel of Pignerol.

Colbert advised the king to form a chamber of justice for the liquidation of the debts of the state. The finances were in a ruinous condition; out of eighty-four millions which the people paid, the treasury received only thirty-two. The farmers of the revenue had in their hands all the resources of the kingdom; it was calculated that during the last five years they had appropriated to themselves eighty millions. They were now called to a severe account, and all the forms of inquisitorial process, torture not excluded, were employed to convict them. The result was that Colbert recovered for the king the sources of the public revenue, and reduced the debts of the state by an arbitrary composition, which was, in fact, a real bankruptcy. Having got rid of the burdens, he next applied himself to simplify and improve the collection of the revenue. He reduced by two-fifths the tailles, or land and income tax, which was unequally distributed, owing to the exemptions of the privileged classes. Finding this tax unmanageable, Colbert preferred reducing it, to make it weigh less heavily on the poorer classes. He founded his chief dependence on indirect taxation, or taxes upon consumption, which he raised not less than tenfold. Besides the octroi, or barrier duty on provisions, of which he appropriated one half to the treasury, and the aides or excise duties on wine and spirits, he imposed a stamp duty upon paper used in commercial and judicial proceedings, a stamp on plate, a duty on paper, a licence duty, and he established the monopoly of tobacco, &c. He also made a new and minute tariff for the custom duties. At his death, 1683, the regular revenue of France was 116 millions of livres, of which 23 were absorbed by the charges of collection and administration, and the rentes or annuities due by the state, leaving ninety-two millions of net receipt, instead of thirty-two, which he had found when he entered on office twenty-two years before. (Lemontey, *Pieces Justificatives*.) But one half only of this increase was obtained through additional taxation; the other half was the result of better order and economy. Colbert however had to deal with a sovereign, absolute, young, fond of pleasure, of pomp, and of war, seconded by an ambitious and unprincipled minister, Louvois. In the latter years of his administration Colbert was therefore obliged to have recourse to ruinous loans, an increase of the oppressive tailles, the sale of offices and honours, and other extraordinary or war expedients. This took place during the second war of Louis XIV., which began in 1672, and ended by the peace of Nimeguen, 1678-9. Colbert's aversion to loans was very great. He said to Lamoignon, who had supported in the council the proposal of a loan, 'You don t know the man we have to deal with (meaning the king). You have opened a sore which your grand-children will not be able to heal.'

Colbert's most strenuous and effective efforts were directed to the encouragement of commerce and manufactures. To accomplish his object, he adopted the only means known at that time, perhaps the only means practicable in his situation, and under such a government as that of Louis XIV., privileges, patents, monopolies, bounties, and honours. He is generally looked upon as the inventor, or at least the great propagator, of the system of the balance of trade. He made numerous regulations to protect, as it was then called, the various branches of national industry. He also forbade the exportation of corn with the view of insuring plenty, but the result was that cultivation declined, and France suffered several severe dearths under his administration. He is accused of having sacrificed agriculture to manufactures, but in fact his principles were erroneous with regard to both. One merchant, more enlightened than the rest, being consulted by him on the best means of favouring commerce, answered him, 'Laissez faire et laissez passer,' 'let us alone, leave us free and uncontrolled in our transactions, and let goods pass freely,'—advice which Colbert did not understand. In the subsequent century there rose in France another school, opposite to his, which saw in agriculture alone the real wealth of a state: these men were called 'economistes.' Mengotti, in his sensible treatise 'Il Colbertismo,' has explained the principles and exposed the errors of both. But whatever may be thought of Colbert's measures, he certainly succeeded in giving a great impulse to French industry; he roused and directed the national mind towards a new and useful exercise of its faculties: the history of French manufactures may be said to begin with Colbert. Woollens, silk, glass, pottery, leather, and iron manufactures, were either created by him, or greatly enlarged and improved. He founded Quebec and Cayenne, made new settlements in India and on the coast of Africa, and favoured the colonies of Martinique and St. Domingo. He chartered privileged companies for the East and West Indies. He turned his attention to internal communications, restored the old roads, constructed new ones, planned and effected the great canal of Languedoc, and projected another in Burgundy. He also established a free port at Marseille, sent consuls to the Levant, and thus secured to France a considerable part of that valuable trade. He bought Dunkerque, and Mardyk, on the coast of Flanders, from Charles II. of England, for the sum of five millions of livres (1662). He also founded the dockyards of Brest, Toulon, and Rochefort. When he was made minister of marine, in 1669, in addition to the other departments he held, France had only a few old ships of war rotting in the harbours. Colbert purchased new ones abroad, constructed others at home, and in 1672 France had sixty ships of the line and forty frigates. But this creation of a navy was extended by the ambition of the king much beyond Colbert's original views, which were chiefly directed to the protection of the merchant trade.

Colbert brought the light of science into the various departments of the administration: his arrangement of the various offices, and the distribution of labour in each, have been highly extolled. He caused the first statistical tables of the population to be made out, and he collected the old charters and historical records of the kingdom. He removed the king's library from the miserable premises in the Rue de la Harpe, placed it in two houses near his own hotel, and increased it from 16,000 to 40,000 volumes. At the same time he formed his own extensive and valuable library, the MSS. of which alone amounted to 14,300 volumes, which his grandson afterwards sold to the king. He instituted a commission of legislation which framed the various ordonnances of civil and criminal process, of commerce, of the woods and forests, and of marine, published in 1670 and the following years, and which with all their imperfections constituted the first code of laws for France, and from which the various legislative commissions appointed by Napoleon drew most of their materials. [CODES, LES CINQ.] It was the first separation of the various branches of legislation, which had till then been confounded together in the

ordonnances issued upon the spur of occasions. He also had a series of laws compiled concerning the negroes and their masters in the colonies, which was called '*le Code noir*.' A minister strict, orderly to minuteness, and averse to prodigality, could not well sympathize with Louis XIV. Colbert was ambitious, and strongly attached to his plans, which he conceived to be for the prosperity and glory of France. In order to captivate the king by means of one of his favourite tastes, that of building, which in some measure coincided with his own views, he purchased the office of superintendent of the public buildings in 1664. The gardens of the Tuileries, the Hôtel des Invalides, the façade of the Louvre, the triumphal arches of St. Denis and St. Martin, the Boulevards, and some of the quays along the Seine, were erected under him. He also began the structure of Versailles; but the king's passion for building, thus stimulated, went far beyond Colbert's intentions, and vast treasures were sunk in a gorgeous and useless work. Colbert instituted the Academy of Sciences, and those of Inscriptions and of Architecture. He reformed the Academy of Painting, and established the school at Rome for French artists. He transferred the Académie Française to the Louvre, and became one of its members. His temper was absolute, like that of his sovereign; he deprived Mézerai of his pension because he had written on the legality of taxation, and he laboured to lower the influence of the parliament of Paris. His manners were cold and repulsive; a poet of the time called him 'a man of marble.' Slow in conceiving his plans, and cautious in deciding upon their execution, he courted and listened to advice; but, when once resolved upon, his will knew no obstacles either of delicacy, feeling, or commiseration. A clear judgment, an iron will, and an indefatigable labour, supported him through his twenty-two years of administration. At last, seeing his rival Louvois enjoying the ascendency over the king's mind, Louis preparing himself for new wars, and maintaining the war-taxes which ought to have been repealed at the peace; grieved also at the incipient persecution of the Protestants, whose commercial and manufacturing industry Colbert fully appreciated, among whom he had chosen some of his best subalterns in the administration, and of whose services he was deprived by an edict which excluded the Protestants from financial appointments, Colbert felt all the pangs of disappointment for his ill-appreciated services. Exhausted with labour he fell ill, and shortly after died, 6th September, 1683, at sixty-four years of age. When near his death a letter from the king was brought to him, but he refused to open it. 'I will hear no more of him; he must leave me in peace now,' he said. 'Had I done for my God what I have done for that man, I should have been saved twenty times, while now I do not know where I am going to.' Father Bourdaloue attended his last moments. The people, enraged at the taxes, threatened to tear his body to pieces. He was buried in the night, attended by a military escort.

Colbert's first son was made Marquis of Seignelay, and another became Archbishop of Rheims. His brother held also high offices, and was made Marquis de Croissy. Colbert built himself a splendid mansion at Sceaux, and he left a fortune of ten millions of livres, the fruits of his rigid economy and of the liberality of Louis. (*Notice sur Jean Baptiste Colbert* in the *Œuvres de Lemontey*, vol. v., *Pièces Justificatives*, Paris, 1829; see also *Mémoires de Charles Perrault*, Colbert's secretary; and *Particularités sur les Ministres des Finances*, par Montyon. The several *Vies* and *Eloges* of Colbert are not worthy of much credit.)

COLCHESTER, a borough and market town, having separate jurisdiction, in the N.E. part of the county of Essex; locally situated in the hundred of Lexden, 22 miles N.E. by E. from Chelmsford, and 51 N.E. by E. from London. The liberties of Colchester, which are co-extensive with the borough, include the town of Colchester, and the parishes of Bere-church, Greenstead, Lexden, and St. Michael, Mile End, and comprise an area of 11,770 statute acres.

Colchester is generally supposed to be the Camalodunum of the Romans. There are few places in England where more Roman antiquities have been found. Morant mentions 'bushels' of coins of Claudius, Vespasian, Titus, Domitian, and their several successors. In addition to which, the town-walls, the castle, many of the churches, and other antient buildings, are chiefly built of the Roman brick. Numerous vases, urns, lamps, both bronze and in pottery, rings, bracelets, &c., as well as tessellated pavements, pateræ, and other Roman antiquities have at various times been dug up within the walls and in the neighbourhood.

By the Britons it was called Caer Colon, and finally by the Saxons Colne-Ceaster, from the Latin 'Castra,' and its situation on the river Colne. Colchester was strongly fortified by Edward the Elder, and although it had gradually diminished in importance as London increased, still at the time of the Norman survey it was a place of considerable note. In 1218 it was taken by Prince Louis, son of Philip II. of France, who had been invited into England by the rebellious barons to assist them against king John. In the reign of Edward III. the town contributed five ships and 170 marines towards the naval armament raised to blockade Calais.

Early in the civil wars the inhabitants of Colchester declared against the Royalists; and in 1648 the town sustained a memorable siege. Having been obliged to surrender to the royal forces, the city was garrisoned by Sir Charles Lucas and Lord Goring. Fairfax soon arrived, and summoned Lord Goring to surrender, and on his refusal, proceeded to storm the city; but after seven or eight hours' attack he ordered his troops to retire, and began the most rigorous blockade. The Royalists bravely held out for eleven weeks, but at last all the provisions of the place having been consumed, and the soldiers and inhabitants being compelled to live on horses, dogs, and other animals, the garrison was obliged to surrender at discretion. Sir Charles Lucas, Sir George Lisle, and Sir Bernard Gascoigne, were condemned to death. Gascoigne being a foreigner, his sentence was remitted, but the other two were shot a few paces from the castle walls. The town was fined 14,000*l*., of which half was levied on the Dutch inhabitants, who were principally merchants that had been driven out of Flanders by the persecutions of the Duke of Alva, and had settled at Colchester. Two thousand pounds were afterwards returned to the inhabitants, but the poor Dutch were not allowed to have any part of it.

The ruins of the old castle, St. John's Abbey, St. Botolph's Priory, the Moot-hall, and its eight churches, form the principal antient and public buildings of Colchester. Of the walls by which the city was surrounded, in consideration of the repairing of which Richard II. is recorded to have exempted the burgesses from sending representatives to three of his Parliaments, only some detached portions now exist. They formed a circumference of one mile and three quarters. The remains of the castle stand upon an eminence to the north of the High Street, and form a parallelogram; the principal entrance is at the south-west corner, beneath a strong semicircular arch with capitals ornamented in the Norman style. The keep is still in a good state of preservation, and its walls are twelve feet thick. The building, which is a compound of flintstone and Roman brick, is so hard that it has frustrated repeated attempts to demolish it for the sake of the materials. The castle was formerly crown property, and the town was feudatory to it.

St. John's Abbey was founded by Eudo, dapifer or steward to Henry I., for monks of the Benedictine order. A handsome gateway, of the later style of English architecture, is all that now remains of this abbey. The last abbot was hanged for treason in 1539, and the site of the monastery passed into the family of the Lucases.

In St. Giles's church, adjoining the abbey, is a monument erected to the memory of Sir C. Lucas and Sir George Lisle. St. Botolph's Priory, not far from St. John's, was founded by Enulph in the beginning of the twelfth century. The remains of the western front of its stately church are highly interesting. A fine semicircular retiring arch, with various mouldings of small Roman bricks and stone alternately, forms the doorway.

Colchester has returned two members to Parliament since the 23rd of Edward I. At the first election after the passing of the Reform Act there were 1099 voters registered. The first charter granted to the corporation was by Richard I. in 1089. It was subsequently extended by Henry V., and renewed by George III. in 1818.

The Corporation hold quarterly Courts of Session for the borough and the liberties: and two Courts of Pleas for the recovery of debts to any amount; one called the law hundred, on Monday, for actions against burgesses, and one on Thursday, called the Foreign Court, for actions against strangers or non-freemen. The Moot-hall is an antient building erected by Eudo, and contains the Hall and Ex-

chequer Chamber, and the Council Chamber, where the business of the corporation is transacted. Underneath is the town gaol.

The town is built on the summit of an eminence gently rising from the river Colne, over which there are three bridges. The streets are wide and generally well paved, and the High Street contains some handsome houses and good shops. It is lighted with gas, and well supplied with water. The theatre is a neat building, erected in 1812. A literary and philosophical society was established in 1820; attached to it is a museum of shells, fossils, and natural objects. There are also a medical society, a botanical society, and a musical society of amateurs. The weaving of baizes, probably introduced by the Flemings in the time of Elizabeth, was carried on here to some extent, but it now has been succeeded by a large silk manufactory. The oyster fishery on the river Colne, granted to the burgesses by Richard I., employs a great number of men, and some hundreds of smacks are engaged in conveying the oysters to London, especially from Pyfleet. The river is navigable for vessels of 200 tons burden to the Hythe, where there is a custom-house and an extensive quay. The market-days are Saturday and Wednesday, for corn and cattle; but a market for meat, fish, and vegetables, is held daily. The fairs are on the 5th and 6th of July, and on the 23rd and 24th of July for cattle; and on the 20th of October for cattle, and three following days for merchandize. The population of the borough and liberties is 16,167, of whom 8696 are females; the population of the town itself is 13,766. There are 2079 families employed in manufactures, trade, &c., and 490 families employed in agriculture.

Colchester was made the seat of a suffragan bishop by Henry VIII., and two bishops were subsequently consecrated there. The church of St. James is a handsome building, erected prior to the reign of Edward II. It has a fine altar-piece representing the 'Adoration of the Shepherds.' St. Peter's was erected before the Conquest, and is mentioned in 'Domesday Book' as the only church in Colchester. It was greatly repaired and modernized in 1758, and large sums of money have been laid out on it since that time. The church of St. Leonard's is large and convenient. There are two places of worship for Baptists, two for Independents, and one for each of the societies of Friends, Wesleyan Methodists, and Unitarians.

The free grammar-school was founded by the corporation, to whom queen Elizabeth, in the 26th year of her reign, granted certain ecclesiastical revenues for that purpose. The number of scholars on the foundation is generally from thirty to forty; the present income is 117*l.* per annum.

Two charity schools for the education and clothing of fifty-five boys and thirty girls were established in 1708; several donations have been since made to these schools. The National School is formed by an extension of the original charity school, and about 400 boys are educated in it, of whom 148 are clothed. There are several schools supported by different dissenting congregations. A school for children of members of the Society of Friends was established in 1816, and endowed with a library and a large sum of money by John Kendall. There is also a Lancasterian school for children of both sexes, supported by voluntary contributions.

There are several alms-houses at Colchester. The Essex and Colchester General Hospital is a neat and commodious building, erected in 1820.

COLCHICA'CEÆ. [MELANTHACEÆ.]

CO'LCHICUM AUTUMNA'LE, or MEADOW SAFFRON, is a plant with a solid bulb-like rootstock, found wild in various parts of Europe, as well as in Great Britain, and forming a gay carpet in the autumn in the fields, where its lively purple crocus-like flowers spring up. Its underground stems, or bulbs, as they are called, and its seeds, abound in an acrid, stimulating, deleterious principle, which has been carefully examined by modern chemists, and forms an important plant in the Materia Medica, large quantities of both rootstocks and seeds being annually consumed in the manufacture of Eau Médicinale, and other medicinal preparations. Its bulb-like rootstock is irregularly egg-shaped, and covered with a dry, brittle, brown skin; at its base it bears a bud, which feeds upon the parent stock, exhausting and finally replacing it every year. Its flowers are large pale purple, and spring up in the autumn without leaves, forcing themselves readily through the soil, and expanding just their orifice, together with the anthers and stigmas, above the surface of the soil, while the tubular part, with the ovary and filaments remain enveloped in membranous sheathing spathes below the soil. Each stock produces six or eight of these flowers. The stamens are six, the ovaries three, each with a long thread-shaped style, and not adhering in any degree to the tube of the flower. These are succeeded by three little follicles, which slightly adhere to one another by their inner edge, and in the spring are elevated above the soil by their lengthened footstalk. At this time, too, the foliage makes its appearance in the form of an erect tuft of broad, oblong, shining, sheathing leaves. Each follicle contains several oblong seeds.

Colchicum is so very like an autumn crocus, that an inexperienced observer might readily mistake the one for the other. They are, however, to be distinguished by the crocus having only three stamens, one style, and an inferior ovary, while the colchicum has six stamens, three styles, and a superior ovary—distinctions of no little importance when the poisonous qualities of colchicum, in which the crocus does not at all participate, are considered.

For medical purposes, the rootstocks of colchicum should be collected at Midsummer, and they should be used immediately; for at that time the peculiar principles which they contain are in the greatest state of concentration. If they are employed at a time when the plant is in a state of growth, especially when it is coming into flower, those principles are partly lost and decomposed by the growth of the plant, and there is no certainty as to the quantity of veratria that a given weight of the rootstocks will yield.

Other species of colchicum are cultivated for the sake of their flowers, but they are of no medicinal importance, and are very badly distinguished from each other by botanists.

Three different parts of *Colchicum Autumnale* yield an active principle used in medicine, but they respectively contain it in the greatest intensity at different seasons of the year; the cormus (incorrectly called root or solid bulb) having it in perfection about June or July, the flowers in September, and the seeds the following spring. The cormus and seeds are most frequently employed in Britain; but should the proper period (Midsummer) for collecting the cormi be neglected, the flowers may be substituted, though they can only be put to immediate use, as they do not keep well. The cormi are found at various depths under ground; when very deep, they are not so good, being the produce of old exhausted plants. Each cormus is about the size of a hazel-nut or walnut, ovate or heart-shaped, consisting of a white fleshy succulent substance, which, when cut across, exhibits roundish plates. It is somewhat flatter on one side, on which also may be discovered a groove, in which is lodged the germ of the flower-stem of the following year. The recent cormus has a nauseous radish-like odour; when dried, no odour; the taste is sweetish-bitter, leaving an acrid sensation in the throat.

The seeds, which should be collected in May, are small, globose, about the size of a grain of millet, of an obscure fawn colour, opaque, rough, and wrinkled, with a white hilum at the base, very hard, tough, and difficult to reduce to powder. The relative proportions of the constituent ingredients of the cormus differ greatly, according to the season of the year when it is taken up for examination, as Stolze's analyses demonstrate. The active principle of colchicum was long considered to be the same as that of veratrum, and thence called veratria; but Geiger and Hesse have shown that it is different, and have termed it *colchicia*. The seeds contain this principle, and likewise some thick oil. Colchicum imparts its activity partially to water, but more so to acetic acid, proof spirit, and wine. A sirup is sometimes formed of it, but it does not keep well.

In a small dose, colchicum causes an increased flow of urine, and more frequent evacuations from the intestinal canal, and occasionally augmented secretion from the skin; in larger doses, frequent evacuations from the intestines, accompanied with pain and tenesmus, and desire repeatedly to empty the bladder. Still larger doses cause increase of all these actions, with vomiting and sense of burning in the throat, insensibility and stiffness of the tongue, escape of blood into the intestinal canal, vomiting of blood, and a flow of bloody urine. Great disturbance of the nervous system is likewise observed, as in other cases of poisoning with acrid substances. The same appearances are found in the intestinal canal, if the poison be injected into the veins.

Even the milk of cattle which have eaten the meadow-saffron becomes capable of causing death. (Vogt.)

In a moderate dose, colchicum seems to increase the quantity and improve the quality of all the secretions of the intestinal canal and the collatitious viscera, especially the liver; but it likewise exerts a sedative action on the heart. Chelius says that in twelve days it doubles the quantity of uric acid found in the urine, a circumstance which explains its utility in gout and rheumatism.

The diseases in which colchicum is most useful are, dropsy, when a small dose is prescribed; gout, in which larger are used; and rheumatism, in which its beneficial influence is first felt on the liver (which is almost always disordered in these diseases), and afterwards on the kidneys, from which a larger portion of uric acid is excreted, and the formation of gout-stones (urate of soda) in some degree prevented. As acid in the stomach renders the action of colchicum more violent, magnesia is usually given along with it. The acetate and acetous extract are the best forms of administration.

COLCHIS, a country of Asia, extending along the eastern shore of the Euxine Sea, from the town of Trapezus (Strabo, p. 548, *d.*) It was bounded on the north by the Caucasus, on the south by Armenia, on the east by Iberia, and on the west by the Euxine. The modern Mingrelia includes only part of this country. The name Colchis appears in the early legends of the Greeks as connected with the expedition of the Argonauts [ARGONAUTS], and the story of Jason and Medea.

The chief river of Colchis was the Phasis, which, receiving the small streams of the Glaucus and Hippus from the neighbouring mountains, flows into the Euxine sea. (Strabo, p. 498, *b.*) Among the most important cities were Pityus, the great mart of the district, Phasis, on the river of the same name, where the Argonauts are said to have landed, Aea on the Phasis, and Cetu. Colchis was a very fertile district and abounded in timber, which was well adapted for ship building, in various kinds of fruits, and in flax. The inhabitants were famed for their linen manufactures, which formed a considerable article of export. The honey, which Strabo (p. 498, *b*) represents as being very bitter, produced violent and even fatal effects on the Greeks who eat of it during the retreat of the Ten Thousand; it deprived them of their senses, disabled them from standing upright, and occasioned vomiting, &c., but finally all recovered. (Xenophon, *Anab.* iv. s. 20). The richness of the country in silver and gold mines, some of which are said to be worked with profit at this day, was probably the cause of the Argonautic expedition. The pheasant (*Phasiana avis*) derives its name from its native place, the banks of the Phasis.

The Colchi were originally from Egypt, according to Herodotus (ii. 104), and part of the army with which Sesostris invaded Scythia. The facts on which he founds his opinion are similarity of physical features, of language, and of peculiar customs, such as circumcision. The curled hair and swarthy complexion, on which Herodotus relies in support of his position, seem however no longer to exist in Mingrelia.

Colchis was governed by kings when we first read of it. Helius is mentioned by Diodorus as king before the Argonautic expedition. Æetes is mentioned by Strabo (p. 45, *d*) as king at the time of the expedition. Colchis was afterwards divided into several small kingdoms or states (Strabo, 45, *d*), and we hear nothing more of it till the time of Xenophon, who (*Anabasis*, v., 6, 37) speaks of a son or grandson of Æetes as reigning over the Phasiani. The Colchi were not then subjects of the Persian empire, but were independent. (Xen. *Anab.* vii. 8, 25.) They opposed the Greeks in the retreat of the Ten Thousand. Mithridates afterwards subdued Colchis, and the government was administered by praefects, one of whom, Moaphernes, was Strabo's uncle. (Strabo, p. 449, *a.*) Under the early emperors, the family of Polemon, a Greek rhetorician, reigned over the Colchians. (Strabo, p. 499, *a.*)

COLD, in Natural Philosophy. [HEAT.]

COLD. [CATARRH.]

COLDEN, CADWALLADER, lieutenant-governor of New York before the revolution, was the author of numerous works on subjects in medicine, natural philosophy, and botany. His father was minister of Dunse in Scotland, where he was born in 1688. He received his medical education at the university of Edinburgh, and in 1708 he emigrated to Pennsylvania, where for several years he practised as a physician. After visiting England, and having established a reputation by 'Remarks on Animal Secretions,' he returned to Pennsylvania, and settled finally, in 1718, in New York, where he was appointed surveyor of the lands of the colony and master in chancery, with a seat in the king's council. His principal works are—'A History of the Five Indian Nations,' 'An Account of the Diseases then prevalent in America,' 'An Essay on the Cause and Remedy of the Yellow Fever, so fatal at New York in 1743;' 'A Treatise on Gravitation,' subsequently enlarged and republished as 'Principles of Action in Matter,' with a treatise annexed, on the 'Elements of Fluxions, or Differential Calculus;' 'An Introduction to Medicine,' 'Remarks on the Inaccuracy of the History of New York.' His favourite study was botany. The *Acta Upsaliensia* (for 17 3-4; *Plantæ Novæboracenses*) contain his descriptions of several hundred American plants, of which 200 were new species. He left a long series of meteorological observations, and a daily register of the thermometer and barometer; and several valuable MSS. on the vital movement, properties of light, intelligence of animals, and on the phenomena attending the mixture of metals. Among his correspondents were most of the leading scientific and learned characters of the age, as Franklin, the earl of Macclesfield, Gronovius, and especially Linnæus, who honoured him by naming a new species of plants *Coldenia.* He died at his seat on Long Island at the age of eighty-nine. (*Biographie Universelle; Encyclop. Americana.*)

COLE, COLZA, a cultivated state of the *Brassica Napus*, which does not form a close head, like cabbage, but has sessile heart-shaped leaves. It is cultivated for its seeds, from which an oil is expressed, which is much used for burning in lamps, and in the manufacture of leather and soap.

There are two varieties of cole, one with white flowers and another with yellow; the latter is the hardiest, and consequently most generally cultivated.

It requires a good loamy soil, well manured, to produce a good crop of cole seed. In rich land lately broken up from pasture, or fenny land newly drained, it grows luxuriantly and gives a great return. It is thought to be a great exhauster of the soil. In a rotation, cole is considered as a good crop to precede wheat. Like rape, which is another variety, it is sometimes sown to be fed off by cattle and sheep on land which is not so well adapted to the growth of turnips.

COLEO'PTERA (κολεόπτερα), in Entomology, a name first applied by Aristotle (*Hist. Anim.* i. &c.), and now universally adopted to designate one of the orders into which insects are divided, the species of which order are commonly known by the name of *Beetles.*

Nearly all true insects, or those annulose animals which have six legs, exhibit, in a more or less developed state, four wings, or members, which, although they may not enable the animal to fly, occupy the same situation, and are analogous to those which in many insects are true organs of flight.

These members are modified in various ways to suit the habits of the species or of the groups in general; but in those insects whose habits are of a nature not to require the power of flight they are very seldom entirely wanting, being found either in a rudimentary state, or modified in their structure so as to perform some other office. In those instances where the wings are only rudimentary, we cannot often assign any positive use for them; we can only perceive that the affinities of the individuals exercise an influence in these respects—that is to say, those species which belong to groups where the individuals generally possess perfect wings will often possess these members in a rudimentary state, when from their habits they do not require the power of flying*. It appeared necessary to make these few general remarks before proceeding to give the distinguishing characters of a coleopterous insect, in order that the nature of these characters and the departures from them might be understood; for it is difficult to give a strict definition of any group of animals.

The insects, then, which constitute the order Coleoptera may be characterized as having four wings, of which the two superior are not suited to flight, but form a covering and protection to the two inferior, and are of a hard and horny or parchment-like nature, and when closed, their inner margins, which are straight, touch and form a longitudinal suture (fig. 16, *c*); the inferior wings, when not

* The females of many moths have only rudimentary wings.

in use, are folded transversely under the superior, and are membranous. From this character of having the *wings in a sheath*, the term Coleoptera was applied, it being composed of the two Greek words κολεός, a *sheath*, and πτερά, *wings*. The superior wings, which form the sheath, are generally called elytra.

The principal exceptions to this general rule are as follows:—those beetles which have no under wings, or have them in a rudimentary state, as in Carabus cancellatus; and those in which the elytra are soldered together at the suture, in which case we believe no under wings are ever found. Another species of Carabus (*C. violaceus*) and many among the Heteromera afford examples of this exception. There are several beetles in which the elytra do not close at the suture, and in which the under wings are not protected by them. Such is the case in the genera *Sitaris*, *Ripiphorus*, and others in which the wing-cases, or elytra, are somewhat pointed; and in the genus *Molorchus*, among the Cerambycidæ, the wing-cases are very short, and the wings are not folded beneath them when at rest. In the Staphylinidæ the wing-cases are also very short, but the under wings, by a series of folds, are, when not in use, entirely concealed beneath them; and as in this tribe the elytra form a straight suture when closed, the only exception consists in the greater number of folds in the under-wings.

Numerous other exceptions might be noticed, but we will merely mention the genus *Meloe*, where one elytron partly folds over the other; the families Lampyridæ and Telephoridæ, in which the elytra are comparatively soft and flexible; and the glow-worm, the female of which beetle has neither elytra nor wings.

The larvæ of Coleopterous insects are generally composed of thirteen distinct segments, the head included. They are almost always of an elongate cylindrical or slightly depressed form; the body is often soft and fleshy, and of a white colour: in these the head is always of a firmer texture, being of a horny nature. The principal parts of the mouth are the same, as to number, as in the perfect insect, although the parts are (as far as our observations go) always differently formed. The head is furnished with two antennæ, which are generally minute, and composed of four joints; and ocelli, or simple eyes, on each side, situated near the base of the antennæ. The body is furnished with six legs, which are attached, a pair to each of the three first segments, or those next the head: the legs are small, and usually terminated by a simple claw. Sometimes in addition to the ordinary legs, the larva is furnished with false legs (often termed pro-legs); these are fleshy tubercles which the animal can protrude at pleasure, and are used to propel the body. Some larvæ have only two of these pro-legs, which are attached to the apex of the terminal segment of the abdomen, or placed beneath that segment; and in the larvæ of the species of Cerambycidæ we find each segment of the body is thickened in the middle both above and below: these parts the animal has the power of protruding considerably, by which means it is enabled to thrust itself forwards or backwards in the holes in the trunks or boughs of trees which are formed by its feeding upon the wood.

The larvæ of groups (generally believed to be natural) very closely resemble each other, though those of different groups are sufficiently distinct: hence a knowledge of the larvæ is of great use in determining the natural affinities of species when their families or sections are not well ascertained.

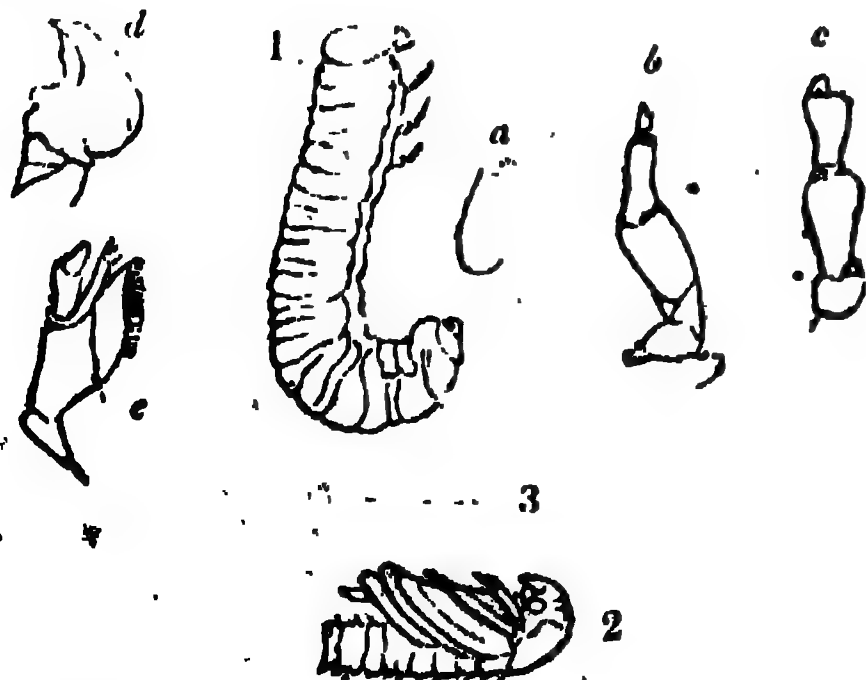


Fig. 1. Larva of a Coleopterous insect: *a*, natural size; *b*, leg; *c*, antenna; *d*, mandible; *e*, maxilla. *Fig.* 2. Pupa state of the same insect. *Fig.* 3. Natural size.

We select as an illustration of the principal characters of a Coleopterous larva, that of one of the Lamellicornes, a group which comprises the common cockchafer, and where the larvæ generally, if not always, have their body bent under at the apex.

We will now proceed to the pupa state of Coleopterous insects. Those larvæ that live in the ground generally prepare for the pupa state by removing the soil which surrounds them so as to form an open oval space: others form a species of cocoon around them, constructed of particles of earth, and other substances within reach, joined together by a kind of web or glutinous substance. Wood-feeding larvæ, or those that live in the trunks or bark of trees, for the most part assume the pupa state without such preparation.

Some larvæ which feed upon plants enclose themselves in a spherical cocoon; others again suspend themselves by the tail and hang from a leaf or stalk of the plant. In one instance we have known the animal to assume the pupa state within the skin of the larva *. The pupæ of Coleopterous insects are what is termed incomplete, *i.e.* all the parts of the perfect insect are distinctly visible, the legs, antennæ, wings, &c. being each enclosed in a separate sheath, and not, as in the pupa or chrysalis state of moths and butterflies, where all the parts are soldered together, or as in the pupæ of the Hemiptera (bug tribe), or Orthoptera (locust tribe), in which stage the insect is active, and in some instances cannot be distinguished from the perfect insect. This character, of *pupa incomplete*, is therefore one of great importance, and is generally added to the definition of a Coleopterous insect, for there are no other insects which, in the pupa state, are incomplete, and which, in the imago state could be confounded with the Coleoptera.

Having traced the beetle through the larva and pupa states, we arrive at the last or imago state, the perfect insect.

Beetles belong to the Mandibulata, which forms the first of the two great sections into which insects are divided: a section, the individuals of which are distinguished by their possessing distinct mandibles; and as the insects of the order Coleoptera possess the mandibles and all other parts of the mouth so well developed, they have by many been placed at the head of the insect tribe. We imagine, however, that the reasons stated for so doing are not sufficient †.

It would require considerable space to enter into the anatomy of an insect: we will therefore at present confine ourselves to the external parts of a beetle, and to those only which it is essential to know, in order to understand the description of these insects.

When we look at a beetle, we perceive that it is composed of three distinct parts, the foremost of which is the head; the next is called the thorax; and the last the abdomen.

The head is furnished with two eyes, two antennæ, and the various parts of the mouth, called the trophi. The eyes are situated on each side of the head, and are generally prominent, and always convex masses composed of an immense number of lenses arranged closely together, so that their interstices form hexagons. These are technically termed compound eyes, and are of a circular or oval form, frequently kidney-shaped, and in some instances (as in the genus Tetrops among the Cerambycidæ) they are completely divided.

The antennæ in Coleopterous insects have their origin generally near the eyes, and are situated for the most part either between them or before them. They are generally composed of eleven joints; in many, however, this number cannot be traced, whilst in some few there appear to be twelve ‡. The form of the antennæ is extremely variable, and will be best understood by an inspection of the following illustrations, among which will be found most of the more common forms, and some of the more extraordinary.

* Megatoma serra, a little beetle, allied to the Dermestes, the larva of which is described in the 'Entomological Magazine,' vol. ii. p. 378.

† It appears that among the various characters which distinguish insects from other invertebrate animals, the great perfection of instinct displayed by them is one of the most striking features; we imagine therefore that that tribe which exhibits this quality in the highest perfection, and at the same time, the species of which possess in a well-developed state all the principal parts found in insects, ought to be looked upon as the head, or typical, group. The insects constituting the order Hymenoptera, since they have all the parts of the mouth at least as well developed as in the Coleoptera, possess four wings formed for flight (which beetles do not), and exhibit the highest degree of instinct, ought, in our opinion, to be considered as the head of the insect tribe.

‡ In some of the species of the family Cerambycidæ.

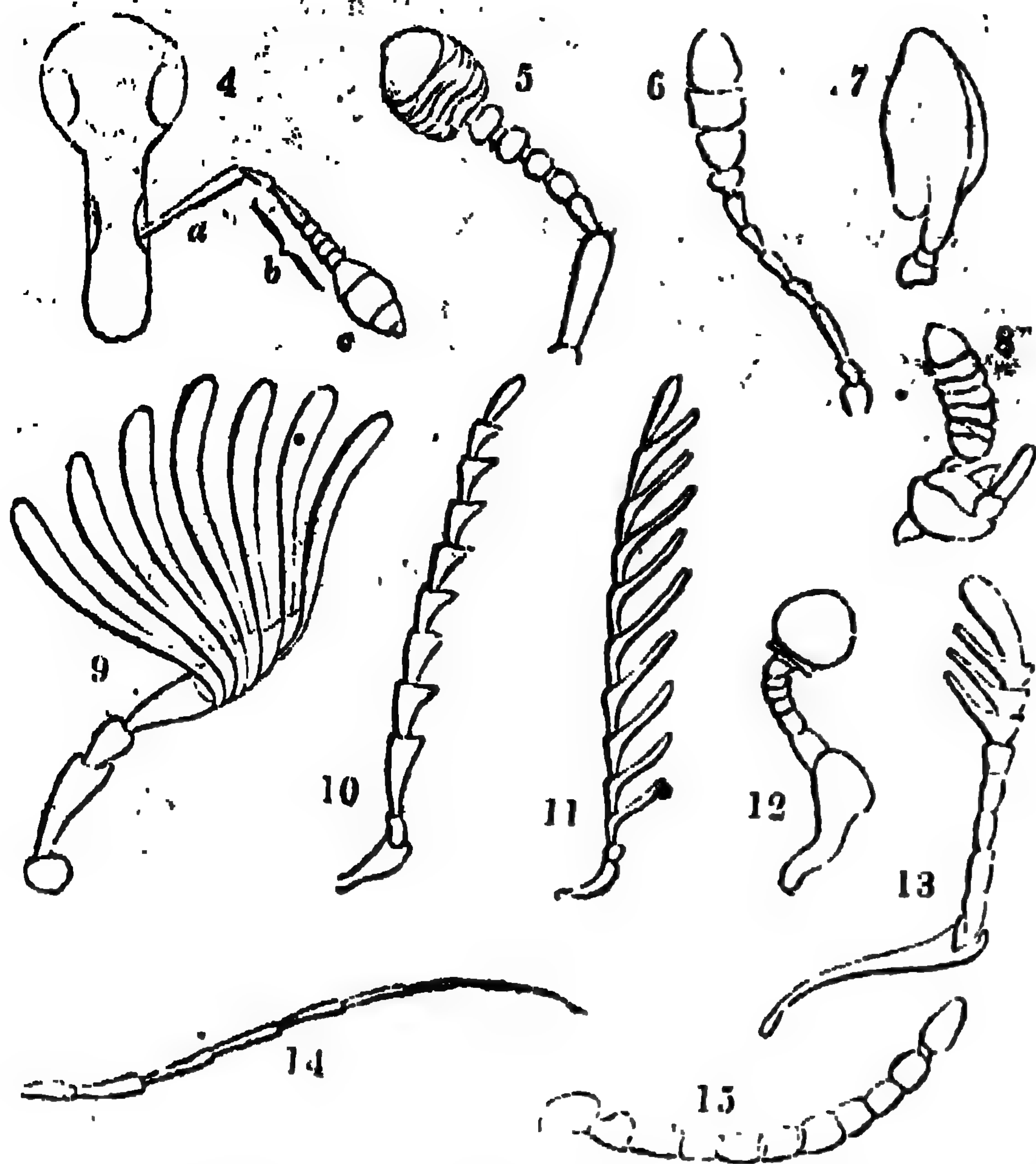
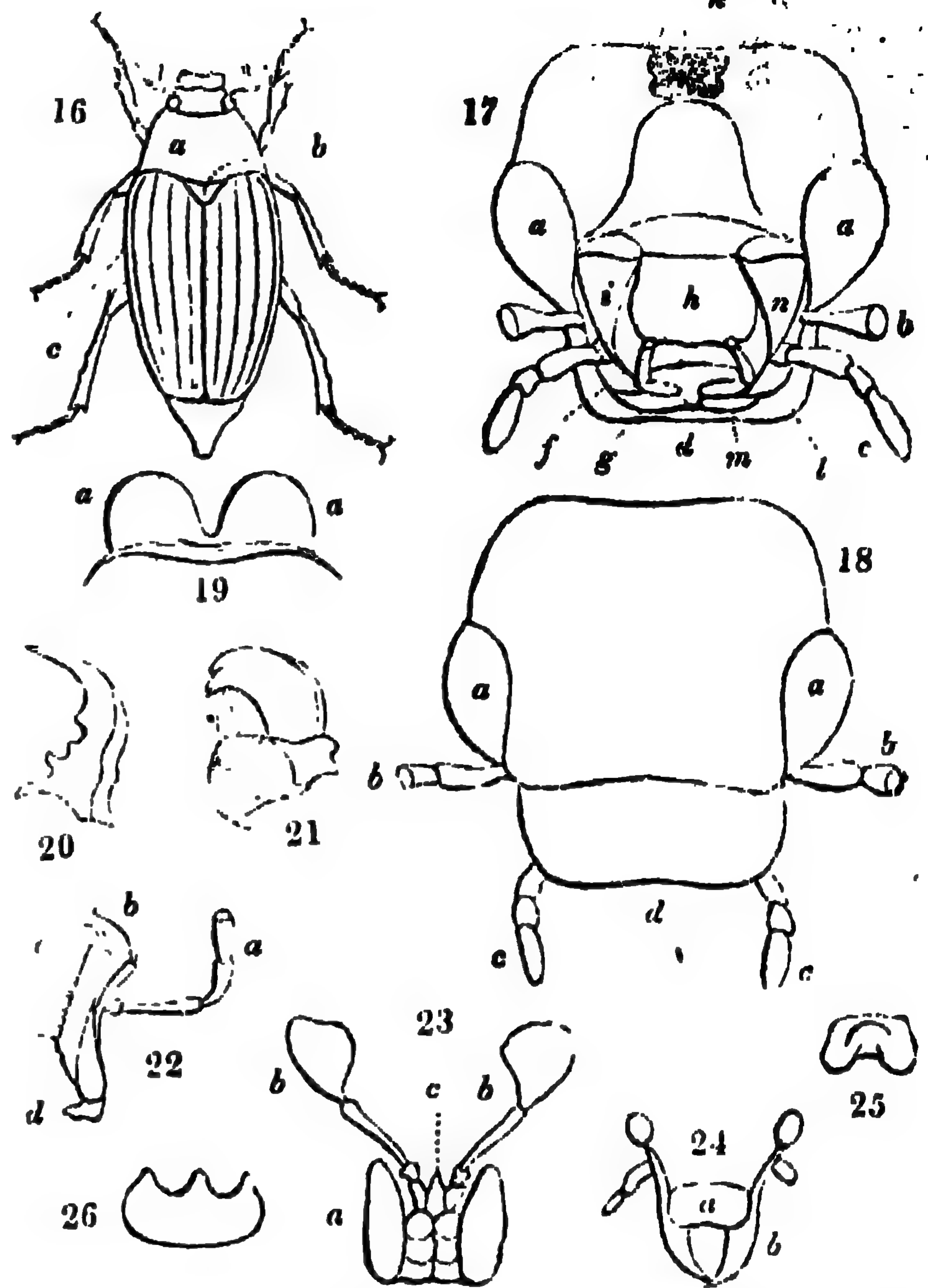


Fig. 4 represents the head (with one antenna attached) of one of the Curculionidæ, a large tribe of beetles, in which the antennæ are what is termed *geniculate**; that is, they have the terminal joints kneed, or bent at an angle with the basal joint. In describing beetles of this tribe, the antenna is generally divided into three parts. The long basal joint (*a*) is called the *scapus*, the several following joints (*b*) are termed the *funiculus*, and the terminal joints which form the knob (*c*) *clava*. *Figs.* 5 and 12 represent antennæ which are termed *capitate*, or which have the terminal joint or joints suddenly enlarged and forming a knob. When the knob exhibits distinct articulations (*fig.* 5), the antenna is termed *capitate with perfoliate knob;* and when the knob does not exhibit articulations, or is composed of a single joint, it is said to be *capitate with solid knob*. Examples of the former will be found in the genus Necrophorus, and of the latter in the genus Monotoma. *Fig.* 6 represents an antenna which becomes gradually thicker towards the apex, and which is termed *clavate*. *Fig.* 7 is the antenna of one of a most extraordinary group of beetles, the Pausidæ, many of which insects have the knob of that member swollen or inflated. *Fig.* 8 is an auriculate antenna, and is so called from its having an ear-like appendage at its base. This description of antenna is found in the genera *Parnus* and *Gyrinus*. *Fig.* 9 represents the antenna of the common cockchafer (Melolontha vulgaris). This form of antenna, which is termed lamellate† is found throughout the immense tribe of beetles called by Linnæus *Scarabæus*, and which has received the name of Lamellicornes from this peculiar character.

It must be observed however that slight modifications are found. *Fig.* 10 is a figure of a serrate antenna. Antennæ are so called when they have the apex of the joints widened, so as to resemble the teeth of a saw. Examples may be found in the Elateridæ and Buprestidæ. Pectinate antennæ (*fig.* 11) are those in which the apex of the joints is produced on one side, and which somewhat resemble the teeth of a comb. There are many examples of this structure in the antennæ of the Lampyridæ, &c., and there are some in which the joints are elongated on each side: these are termed *bipectinate*. *Fig.* 13 is what is called a fissate antenna (the joints on one side divided as by incisures). This form of antenna is found in the genus Lucanus. *Fig.* 14 represents a very common form of antenna (where it is slender and tapering gradually to the apex); it is termed *setaceous*, and most of the Carabidæ and Cerambycidæ will afford examples. The antennæ termed *filiform* somewhat resemble the last, but the joints are all of equal thickness throughout. The last description of antennæ which we shall notice are those termed *moniliform* (*fig.* 15). Here all the joints are oval or round, and resemble a necklace of beads. Examples are found in many of the species of the section Heteromera.

There are many other variations in the antennæ of Coleopterous insects which might be noticed, and for descriptions of which we refer our readers to Kirby and Spence's *Introduction to Entomology*, vol. iv., p. 324. Most of those here noticed are the more common forms, and occur frequently in our descriptions of insects of this tribe.



We now come to the parts which constitute the mouth of a beetle—these, it is scarcely necessary to say, are situated in the fore part of the head; they consist of a *labrum*, or upper lip, two *mandibles*, or jaws, two *maxillæ*, or under-jaws, and a *labium*, or under lip. These are the six principal parts. We shall however also notice the portions called the *mentum*, or chin, and the *clypeus*, since they are frequently mentioned in descriptions.

The *labrum* is a movable plate, often on the same plane with the fore part of the head, which it terminates, and generally covers the base (at least) of the mandibles above; hence it is frequently called the upper lip, forming as it does the upper boundary of the mouth.

This portion, although of various forms, is less liable to variation than most of the other parts of the mouth. The most common form perhaps is somewhat quadrate, or broader than long, as in *fig.* 24, *a*.

Upon referring to the article CARABUS, it will be seen that that genus and some other closely allied genera are separated chiefly on account of the difference in the form of this member. In one it is described as bilobate; by this is meant, that the labrum is notched in the middle, so that the two side pieces form lobes (see *fig.* 25). When the labrum is not thus notched, but presents an even anterior margin, it is described as *entire*. In one of the other genera (*Procrustes*), where the labrum is described as *trilobate*, the only difference consists in its having two notches on the anterior parts, and thus separated as it were into three lobes.

The *clypeus* is the part to which the labrum is attached, and which is usually on the same plane with it. The term *Clypeus* will seldom be found in descriptions, excepting in giving the characters of those beetles which belong to the Lamellicornes, a tribe in which this part is greatly developed (*figs.* 17 and 18, *d*), and where the labrum is hidden beneath it.

Under the labrum, the mandibles (*mandibulæ*) are situated. These, as their name implies, are the organs of manducation; they move horizontally, and are most com-

* In Kirby and Spence's 'Introduction to Entomology,' the antennæ of the Curculionidæ are termed *Antennæ fractæ*; *Antennæ geniculatæ* being applied to such as the antennæ of the Meloe. The above, however, is the more common application of the term.

† From Lamellæ, layers.

monly of a shape more or less approaching to a triangle. Their form however varies according to the food of the insect.

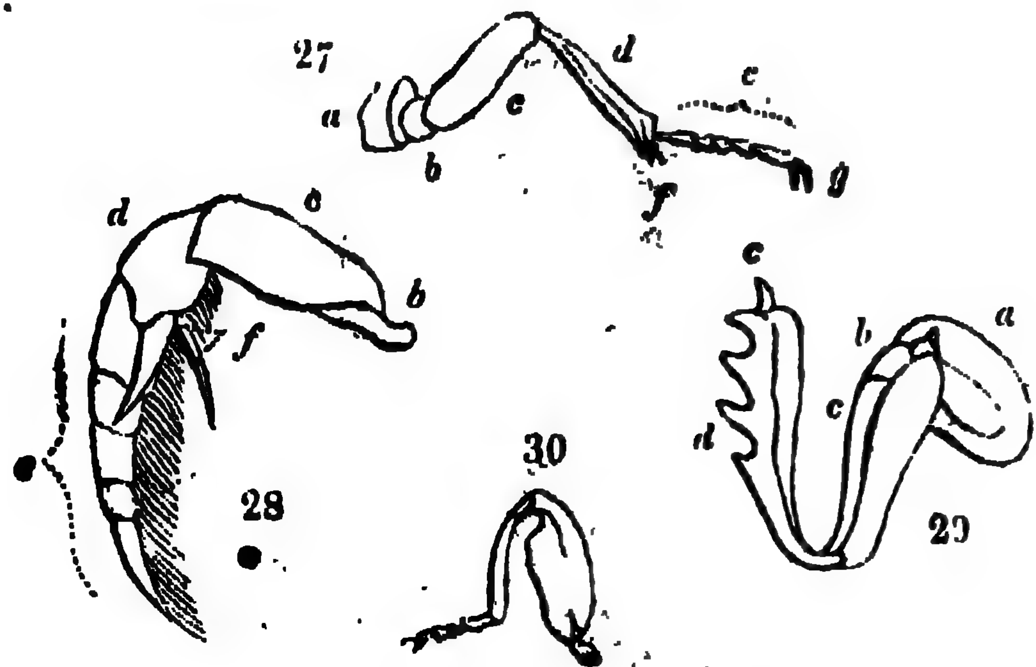
Generally speaking, in beetles which feed upon vegetable substances the jaws are broad, obtusely pointed at the apex, and have moreover a broad flat surface at their base (often with little sharp ridges), which somewhat resembles a molar tooth of herbivorous quadrupeds. (See *fig.* 21.) In those species whose habits are carnivorous, the jaws are longer and less stout, have the apex acutely pointed, and several sharp tooth-like processes on their inner side. (See *fig.* 20.)

Next in succession follow the *maxillæ*, or under jaws (*fig.* 17, *n*, and *fig.* 22): these organs are situated beneath the mandibles, and, like them, move horizontally. A typical maxilla consists of several parts, the principal of which are, the hinge (*cardo*), a piece situated at the base of the maxilla (*fig.* 22, *d*), the maxillary palpus (*fig.* 22, *a*), an articulated organ generally composed of four joints, the outer lobe (*lobus superior*), which in beetles of carnivorous habits is a two-jointed process (*fig.* 22, *b*) situated between the maxillary palpus and the inferior lobe (*lobus inferior*), which last portion constitutes the inner part of the maxilla, and is often formed like the blade of a knife, and furnished generally with a series of bristles or hairs on the inner edge. (See *fig.* 22, *c*.) The maxillæ seem to be used with the labium in directing the food during manducation, and the bristles on the inner edge appear to serve as a kind of strainer through which the juices are pressed, for we observe that solid substances are seldom swallowed by insects in their imago state.

The *labium*, or under lip (*fig.* 17, *h* and *g*, and *figs.* 23 and 26), is a movable organ which serves to close the mouth beneath, and is generally divided by a transverse suture, in which case the lower portion constitutes the *mentum*, or chin. The tongue (*fig.* 23, *e*); which may be considered as a portion of the labium, in Coleopterous insects, is usually situated at the apex of that member, or emerging from it. The *labial palpi* (*fig.* 23, *b*, *b*, and *fig.* 17, *f*) are two articulated organs, usually springing from the summit of the labium on each side.

Having now briefly noticed the head and its parts, we come to the thorax. On this portion it will be unnecessary to dwell: we need only mention that the thorax in insects is composed of the three first segments of the body, which in the larva state are usually distinct; these are termed the *prothorax*, *mesothorax*, and *metathorax*; and it generally happens that in the perfect insect one of these segments is greatly developed at the expense of the other two, particularly on the upper surface of the body; such is the case in the Beetle tribe, where the first portion or prothorax *fig.* 16, *a*) and the small plate (*fig.* 16, *b*), which is a part of the mesothorax, are all that is visible from above when the elytra are closed. Some few entomologists, therefore, in describing beetles, call the part (*fig.* 16, *a*) the prothorax, but it is most commonly called the thorax. The small plate (*fig.* 16, *b*) above referred to is called the scutellum, and is usually of a triangular form.

To the thorax are attached the legs and wings: the anterior pair of legs are attached to the prothorax; to the mesothorax the intermediate pair of legs and the anterior pair of wings, or elytra, as they are termed in the Coleoptera; and to the metathorax, the posterior pair of legs and the hinder pair of wings. Of the wings enough has been said for the present



The legs in beetles vary according to their habits: thus in some they are formed for running (*fig.* 27), in others for swimming (*fig.* 28); here they are very broad and flat; in others again their structure is suited to burrowing habits (*fig.* 29); and *fig.* 30 represents the hind leg of a beetle, which has the power of leaping to a great distance, where the thigh is very large.

A leg may be divided into five principal parts: the *coxa* or hip (*a*, *figs.* 27 and 29), which is the first joint, or that joined to the body, where it plays in a socket; the next part or second joint of the leg is the *trochanter* (*b*, *figs.* 27, 28, and 29); the third is the *femur* or thigh (*c*, *figs.* 27, 28, and 29); the fourth joint is called the *tibia* or shank (*d*, *figs.* 27, 28, and 29); the fifth and last part is the *tarsus* (*e*, *figs.* 27, 28, and 29); this part, in a great portion of the Coleopterous insects, is composed of five joints; in many a lesser number is found, but in none do they exceed five: the last joint of the tarsus is usually terminated by two hooked claws called *unguiculi* (*g*, *fig.* 27), and the apex of the tibia is furnished generally with two straight spines called the *calcaria*. (See *f*, *figs.* 27 and 28.)

The object in noticing the above parts of a Coleopterous insect is principally to make our descriptions of the species of this order intelligible to the general reader; and as the abdomen offers nothing of consequence, or rather nothing but what may be understood by its description under the various heads, we refrain from making any further remarks on the anatomy of the Coleoptera in this article, and now proceed to the classification.

As regards the classification of the Coleoptera, as well as of insects in general, in almost every work which treats of the subject, a new method is proposed. We shall content ourselves, however, with noticing two—that which is most commonly adopted on the continent, and that which is followed by most entomologists of our own country: the former is the method proposed by Latreille, and the latter that by Mr. Stephens.

In the classification of the Coleoptera, published by Mr. Stephens in his 'Systematic Catalogue of British Insects,' the various sections and subsections are as follows.

Order, Coleoptera.

Sect. 1. Adephaga	Sect. 3. Helminthomorpha
Subsect. 1. Geodephaga	Subsect. 1. Rhinchophora
2. Hydradephaga	2. Longicornes
3. Philhydrida	Sect. 4. Anoplurimorpha
4. Necrophaga	Subsect. 1. Eupoda
Sect. 2. Chilognathomorpha	2. Cyclica
Subsect. 1. Clavicornes	3. Trimeri
2. Lamellicornes	Sect. 5. Heteromera
3. Sternoxi	Sect. 6. Brachelytra
4. Malacodermi	

The arrangement of Latreille is founded upon the number of joints of the tarsi; he accordingly divides beetles into the four following great sections:—

Section 1. Pentamera, including all those beetles which have five joints to their tarsi.
Section 2. Heteromera, beetles with five joints to the tarsi of the two anterior pairs of legs, and four to those of the posterior pair.
Section 3. Tetramera, beetles with only four distinct joints to all the tarsi.
Section 4. Trimeri, beetles with only three distinct joints to the tarsi*.

On comparing these two arrangements, it appears that there is considerable difference of opinion between the authors of them as to the value of certain groups. The Trimeri, according to Latreille, is made one of the four great sections, whilst Mr. Stephens makes the same group a subsection of a tribe of not equal importance with Latreille's first division, the *Pentamera*.

These discrepancies probably arise from the want of some standard by which the importance of characters may be estimated. We find a great number of insects possessing certain characters in common, but it often happens that we cannot ascertain what influence these characters have on the habits and economy of the individuals. In such instances, the most correct way perhaps would be to judge of the value of a character by its constancy; or, in other words, to consider that character of most importance, as regards classification, which is found in the greatest number of

* In the two latter sections there is a minute rudimentary joint at the base of the terminal one.

species, these species agreeing more or less in some other points.

In all groups of animals there are, however, certain typical characters to which all the species approach more or less, and which perhaps the greater portion actually possess. The typical characters of a group, and the departures from them, ought not therefore to be selected for constructing natural and equivalent groups. In the Coleoptera, for instance, the typical structure is to possess five joints to the tarsi; Latreille's first section (the *Pentamera*) consequently comprises at least half the species and several distinct groups, each of which is equivalent to one of his other sections.

It appears to us, being guided by the points above mentioned, that the order Coleoptera contains the thirteen following distinct sections, and that Latreille's groups are not natural.

All the Tarsi with five joints.

Section 1. Geodephaga, *Mac Leay.*
2. Hydradephaga, *Mac L.*
3. Brachelytra, *Latreille.*
4. Necrophaga, *Mac L.*
5. Palpicornes, *Lat.*
6. Lamellicornes, *Lat.*
7. Sternoxi, *Lat.*
8. Malacodermi, *Lat.*

Five joints to the tarsi of the two anterior pairs of legs, and four to the posterior pair.

9. Heteromera, *Lat.*

All the Tarsi with four joints.

10. Rhyncophora, *Lat.*
11. Longicornes, *Lat.*
12. Cyclica, *Lat.*

All the Tarsi with three joints.

13. Trimeri, *Lat.*

The number of species of beetles in existence may probably amount to between thirty and forty thousand.

The principal works on the Coleoptera are as follows:— Fabricius (J. C.), 'Systema Eleutheratorum;' Olivier (A. T.), 'Entomologie, ou Histoire Naturelle des Insectes,' 5 vols. folio, with coloured plates; Paykul (Gustavus), 'Fauna Suecica,' 3 vols.; Gyllenhal (L.), 'Insecta Suecica;' Schœnherr (C. J.), 'Genera et Species Curculionidum;' Dejean, 'Species général des Coléoptères;' five volumes of this work are published, and contain descriptions of the genera and species of the Carabidæ and Cicindelidæ. Besides these, the works of Germar, Illiger, Sturm, Knoch, and Duftschmid may be consulted; and the Coleoptera of our own country will be found described in Stephens's 'Illustrations of British Entomology.'

COLERIDGE, SAMUEL TAYLOR, was born at Ottery St. Mary in Devonshire, of which parish his father was the vicar, on the 21st October, 1772. He was the youngest of a numerous family, and became an orphan at the age of nine. Owing to the straitened circumstances of his family, he was sent to be educated at Christ's Hospital, where the late Charles Lamb was among his contemporaries. Here he made very great progress in classical knowledge; as may be inferred from the fact that he had, before his fifteenth year, translated the hymns of Synesius into English Anacreontics. His choice of these hymns for translation is explained by his having, even at that early age, plunged deeply into metaphysics. Speaking of himself in the 'Biographia Literaria' (vol. i. p. 15), he says, 'At a very premature age, even before my fifteenth year, I had bewildered myself in metaphysics and in theological controversy. Nothing else pleased me. History and particular facts lost all interest in my mind. Poetry itself, yea, novels and romances, became insipid to me.' From such pursuits he was however weaned for a time, while yet at Christ's Hospital, by the perusal of Mr. Bowles's Sonnets, which had then just been published. The powerful influence which these sonnets exercised upon his mind is described at length in the first chapter of the 'Biographia Literaria.'

In 1791 Coleridge entered Jesus College, Cambridge. While at the university, he did not turn his attention at all to mathematics; but obtained a prize for a Greek ode, and distinguished himself in a contest for the Craven scholarship, in which Dr. Butler, the present bishop of Lichfield, was the successful candidate. He did not take a degree. During the second year of his residence he suddenly left the university in a fit of despondency, occasioned, it is said, by unrequited love; and after wandering for a while about the streets of London in extreme pecuniary distress, terminated this adventure by enlisting in the 15th dragoons, under the assumed name of Comberback. One of the officers, accidentally discovering his classical acquirements, was led to conclude that Comberback was something more than he professed. Questioning him in a friendly manner, and eliciting his real history, he communicated Coleridge's situation to his friends, who forthwith effected his discharge.

Coleridge now betook himself to Bristol, where Mr. Southey was then residing. He shortly after set on foot a periodical entitled the 'Watchman,' which was to advocate liberal opinions; and made a tour through the northern manufacturing towns for the purpose of canvassing for subscribers. An account of this tour, amusing on the whole, is contained in the 10th chapter of the 'Biographia Literaria.' The periodical, owing partly to a want of punctuality in its appearance, and partly to the fact that its opinions were not those which its supporters had expected, did not live beyond the ninth number.

In the autumn of 1795 Coleridge married Miss Sarah Fricker of Bristol, Southey on the same day wedding himself to her sister. He now took a cottage at Nether Stowey, a village at the foot of the Quantock Hills, in Somersetshire, where he was in the immediate neighbourhood of his friend and benefactor, Mr. Poole, and of Mr. Wordsworth, who was then living at All-Foxden. He was at this time in the habit of contributing verses to one of the London papers, as a means of subsistence. In 1796 he published a volume of poems, the greater number of which had been written at earlier periods, interspersed with some by Charles Lamb; and in 1797 a second edition appeared, with the addition of some poems by Charles Lloyd*.

During the three years, moreover, in which Coleridge resided at Nether Stowey, the greater part of his principal poems was composed, though most of them were not published until later. In the conversations on poetry which constantly took place between Mr. Wordsworth and himself was first formed the plan of the afterwards famous Lyrical Ballads; and in pursuance of this the 'Ancient Mariner' and the first part of 'Christabel' were written in 1797. His tragedy, 'The Remorse,' was also written at this period.

Coleridge was at this period of his life a unitarian. He says of himself, 'I was at that time and long after, though a trinitarian (*i. e. ad normam Platonis*) in philosophy, yet a zealous unitarian in religion; more accurately, I was a *psilanthropist*, one of those who believe our Lord to have been the real son of Joseph, and who lay the main stress on the resurrection rather than the crucifixion.' (*Biogr. Lit.*, vol. i., p. 168.) While at Nether Stowey, he used to preach in a unitarian chapel at Taunton.

In 1798 Coleridge was enabled, through the munificence of the late Mr. Thomas Wedgwood, to visit Germany, for the purpose, as he expresses it, of finishing his education. At Göttingen he attended Blumenbach's lectures on physiology and natural history, and studied, in the notes of a young German student, Eichhorn's lectures on the New Testament. He took lessons from Professor Tychsen in the Gothic of Ulphilas, being anxious to attain a critical knowledge of the German language; and went through a complete historical course of German literature. His acquaintance with the writings of the later German metaphysicians was not formed until some time after his return to England.

After his return from Germany, Coleridge resided at the Lakes, where Mr. Southey and Mr. Wordsworth had then settled, the one at Keswick, and the other at Grasmere. The appellation of Lake-poets, given to these three individuals after the publication of the 'Lyrical Ballads,' is well known.

Coleridge now became connected with the Morning Post, and wrote both on politics and literature. From about 1808 to about 1814 he contributed to the Courier. In 1804 he had visited his friend Dr. Stoddart at Malta; and from May of that year to October of the next, he acted as

* It is stated in the 'Biographia Literaria' (vol. i., p. 2), that this volume of poems appeared in 1794. The title-page of the earliest edition that we have been able to find (and the absence of the words 'second edition' from the same title-page renders it improbable that there should have been an earlier edition than this) says 1796.

secretary to Sir Alexander Ball, then governor of the island. After his return to England in 1808, he delivered a course of lectures on poetry and the fine arts at the Royal Institution. The 'Friend' appeared in the course of the next year, being then published as a periodical at the Lakes. As a pecuniary speculation it was not much more successful than the 'Watchman,' nor with reference to pecuniary advantage was it more judiciously conducted; but it continued for a longer time. Mr. Wordsworth gave some literary assistance, contributing the 'Essay on Epitaphs,' which is now appended to the 'Excursion,' and the 'Introductory Essay' of the third volume.

Coleridge left the Lakes in 1810, and did not afterwards return to them. On his first arrival in London he resided with Mr. Basil Montagu; and not long afterwards became the guest of Mr. Gillman at Highgate, in whose house he died. The many friendships which Coleridge attracted to himself through life, the sincerity and constancy of which were abundantly shown, place in a striking light the amiability of his character.

It was not before the commencement of his residence in London that he formed any very extensive acquaintance with the writings of the later German metaphysicians; by the adoption of whose method and terminology, rather than by any development of a system, in his subsequent publications, he has come to be accounted the representative of German metaphysics among us. He published successively, between the years 1817 and 1825, the two 'Lay-Sermons,' the 'Biographia Literaria,' the *rifaccimento* of the 'Friend,' the 'Constitution of the Church and State according to the Idea of each,' and the 'Aids to Reflection.'

Coleridge having no profession, slothful and imprudent, was during the greater part of his life in pecuniary distress. After his connexion with the newspaper-press had ceased, and his remaining hopes of self-support were derived from his later poetical and prose publications, his publisher became a bankrupt in 1819. This was a severe blow to Coleridge. The dependent situation in which it placed him preyed much upon his mind. We see him, in the collection of his letters which has been lately published, projecting various schemes to relieve himself. One of these was a scheme of systematic contribution to Blackwood's Magazine, the publisher of which was his friend. Accordingly, No. 1 of a 'Selection from Mr. Coleridge's Literary Correspondence' appeared in the number of that Magazine for October, 1821, and was to have been followed by a sketch of the history and philosophy of Superstition, with other interesting disquisitions. But the No. 2 never appeared. Continued ill health, combined with, and to a certain extent caused by, a habit of using opium which Coleridge had contracted, having originally resorted to it, under a mistaken notion, for medicinal purposes, had taken away from him by this time even what little amount of perseverance he might once have possessed*.

On the incorporation of the Royal Society of Literature by George IV. in 1825, Coleridge was selected as one of the ten Royal Associates, and as such received from that time 100 guineas a year out of the king's private purse. The annuity was withdrawn at the commencement of the present reign.

In his later years Coleridge was in the habit of holding weekly *conversazioni* at Mr. Gillman's house in Highgate. Those who knew little else of Coleridge are familiar by report with his extraordinary conversational powers. Of these the two volumes of 'Table Talk,' which have been published give no adequate notion. His conversation was not in fragments, but was wont to continue without aid from others, in the way either of suggestion or of contradiction, for hours at a time. All things human and divine, joined with one another by subtlest links, entered into his discourse; which, though employed upon abstrusest subjects, was a spell whose fascination even the most dull or ignorant could not resist.

In June, 1833, Coleridge was present at the meeting of the British Association of Science held that year in Cambridge. He died on the 25th July, 1834, in his 62nd year.

Though not a man of strong character, Coleridge possessed many amiable qualities. He had all the social affections strongly developed. Though he was not, in our opinion, eminently successful in attaining it, he had an earnest desire of truth. Thus he was by nature tolerant. But in his later years disease seems to have engendered an asperity in judging of the motives of others which was by no means consonant with the tenor of his earlier publications. To the same cause must be assigned a querulousness of disposition, which is exhibited in almost all his prose writings.

He was in person, as Mr. Wordsworth has described him, 'a noticeable man with large grey eyes.'

As a writer, Coleridge is to be viewed principally under two aspects: as a poet, and as the author of certain prose writings which, though miscellaneous in character, are chiefly employed upon metaphysical subjects.

As a poet, he was for a long time coupled, owing to the joint publication of the Lyrical Ballads and other accidental circumstances, with Mr. Wordsworth. Now that the derision against the Lake-school, eminently unjust as falling chiefly upon Mr. Wordsworth, has died away, the force of reaction has supplied a tendency, also erroneous in our opinion, as far as Coleridge is concerned, to run into the opposite extreme of admiration. In his translation of Schiller's 'Wallenstein' he has displayed taste and judgment of a high order. His own tragedies, the 'Remorse' and 'Zapolya,' contain many passages excellent for the apt expression of just thoughts and tender feelings. The 'Ancient Mariner' is a successful effort of fancy, in a region which had not before been tried and the 'Christabel' contains a highly-wrought passage on divided friendship, which those who have once read cannot forget. In some of his smaller poems again a happy conceit is happily developed. But he is a poet of art rather than of nature. He has himself frequently admitted that his earlier poems are faulty, by reason of turgidness of style. It may be added that they show few signs of an original genius. There is none of that freshness and individuality about them which have always marked the earliest efforts of great poets, which (to confine ourselves to modern instances) are seen in all the poems of Wordsworth and Shelley, and in a most remarkable degree in the lately-published poems of Mr. Tennyson. And even in that department of poetic art which pertains to melody, in which we admit Coleridge's excellence, we deem the Choric Song in Tennyson's 'Lotos-Eaters' far superior to Coleridge's 'Kubla Khan.'

As regards the attainment of their chief professed end, or the advancement of mental, moral, and political science, we consider Coleridge's prose writings of little or no value. To overthrow the ascendency of Locke and Paley was, we learn from himself, the object of his ambition. In the first place, we approve not of such an object; in the second place, we assert that next to nothing was done towards its accomplishment.

In mental science, or psychology, he espoused a particular hypothesis (that propounded by Schelling) of the *absolute*. Now Schelling and Fichte and Cousin, and other philosophers of this school, appear to us to have perverted psychology as completely as, and more perniciously than, the Materialists. Each set of philosophers have transcended the limits of consciousness, and have left observation for conjecture. But, apart from the system itself, Coleridge has done little either to advance or diffuse it. As he got it from Germany, so has he left it*; and his writings, from their method and style, are not fitted for the use of learners.

* One among the many inaccuracies into which the English Opium-eater (Mr. De Quincey) has fallen in his articles on Coleridge in Tait's Magazine, is a statement that Coleridge first resorted to opium for the pleasurable excitement which it affords. This statement has been contradicted by the editor of Coleridge's Table-Talk, who also informs us that Coleridge had entirely conquered the habit some time before his death.

* The passage in Coleridge's writings which approaches nearest to a systematic exposition of his views, viz., the 12th chapter of the 'Biographia Literaria,' is little more than a translation from the introduction to Schelling's 'System of Transcendental Idealism.' Mr. De Quincey (Tait's Magazine, Sept., 1834) has, in respect of this passage, charged Coleridge with *plagiarism* from Schelling. Professing to bring five instances, of which this is one, of unavowed obligation to other writers, he has founded upon these a charge of habitual plagiarism.

As regards the particular charge, which relates to this passage in the 'Biographia Literaria,' the observations which are made concerning Schelling in the preceding chapter, and which have been misrepresented by Mr. De Quincey, acquit Coleridge of plagiarism.

As regards the general charge, the instances brought forward are also inadequate to its establishment. One of them, that concerning the interpretation of the Pythagorean caution against Beans, is altogether frivolous. The next, though they are not adequate to establish a habit of plagiarism, are adequate to prove that Coleridge was accustomed to trust to others for suggestions upon which he improved, and for ideas which he elaborated. Of this habit another instance is supplied by Alvar's dungeon soliloquy in the 'Remorse' (act v., scene 1), the ideas, and to a certain extent, the words of which are derived from Caleb's prison soliloquy in Godwin's 'Caleb Williams.' The anecdote concerning the origin of the 'Ancient Mariner,' and Coleridge's denial of it (which anecdote neither Mr. Hare nor Mr. Nelson Coleridge have given any reason for disbelieving), are eminently characteristic of a person having this habit. The habit may be partly accounted for by indolence. It is chiefly to be explained, we believe, by the fact that Coleridge's was not properly an original mind.

In moral science, which, properly speaking, is no other than what Hobbes long ago stated it to be, the science of what is just and what is unjust, and which, thus viewed, has been significantly named Deontology by Mr. Bentham, Coleridge also followed the later German metaphysicians. These make moral science a part of, and in fact confound it with, psychology. In following them he thought it necessary to declare eternal warfare against the school of writers who have been absurdly named 'Utilitarians.' He contends for a something within us which, 'being absolutely *unique*, no man can *describe*' (*Friend*, vol. i., p. 256), which 'bearing the same relation to God that an accurate timepiece bears to the sun,' faithfully tells God's will, and which has the various names of 'universal reason,' 'practical reason,' 'moral sense,' 'moral instinct,' 'conscience.' 'Good and evil,' 'just and unjust,' are determined by the decisions, from which there is no appeal, of this inward monitor. This system professes to be diametrically opposed to that which makes the whole tendency of an action to affect men's happiness, or the sum of possible consequences in respect of general happiness, the principle of morality. Yet its professors cannot stir beyond the bare enunciation of their own principle without drawing for aid upon the principle which they impugn. But, inasmuch as they disavow this aid, their system comes before us as one continued *petitio principii*.

Coleridge's political doctrines are explained in the first section of the 'Friend.' This section is but one series of confusions and mis-statements. In the very outset the phrases 'political justice' and 'origin of government' are used as convertible expressions. Hobbes is made to deny *right* and *duty*. Rousseau's theory of a social contract, as explanatory of the origin of government, is accounted proof that he could not and did not admit expediency as the principle by which the government when formed should be guided. Other similar instances might be easily cited.

Yet there is not one of Coleridge's prose writings which has not incidental merits sufficiently many and great to rescue it from oblivion - merits discernible either in scattered criticisms on our older writers both of poetry and prose, or in illustrations drawn from stores of knowledge which a very wide reading had amassed, or in passages of great acuteness and sound practical wisdom, whenever the author lowers his flight to subjects to which such qualities can be applied with any hope of profit. And though, from the combined effects of indolence and of an intense devotion to conversational display, his ordinary style of writing is rambling and obscure, these works contain occasional passages of great beauty and power. In treating lighter subjects, his style may even be pronounced happy. Witness his account of Sir Alexander Ball in the third, and the tale of Maria Schöning in the second, 'Landing-place' of the 'Friend.'

Coleridge's fame will principally rest upon his powers as a critic in poetry and the fine arts. To establish his fame in this respect, there are his Lectures delivered at the Royal Institution (just published in the 2nd volume of Coleridge's 'Literary Remains'), his review of Mr. Wordsworth's poetry, in the 2nd volume of the 'Biographia Literaria,' which is perhaps the most philosophical piece of criticism extant in the language, and also his review of Mr. Maturin's 'Bertram,' which, though, when first published, it exposed him to much obloquy and many imputations of jealousy, is distinguished from common criticisms, if by nothing else, by a constant reference to first principles and a freedom from personality.

We do not place Coleridge in the first class of thinkers and writers; nor do we consider his to have been, in any high degree, an original mind. In support of this opinion, our limits will now only allow us to adduce the two following considerations. First, he was ever changing his opinions: and each new opinion, bringing with it a new idol, was preached with the utmost extravagance until it was in its turn displaced by another. Secondly, one fault which pervades his prose writings is an excess of quotation. They are the works (and, so far as this implies praise, we most willingly concede it) of a man of very extensive reading; but they are also the works of one who requires something from another whereon to hang whatever he may himself have to say.

COLET, JOHN, the founder of St. Paul's School, was born in the parish of St. Antholin, London, in 1466, and was the eldest son of Sir Henry Colet, Knight, twice Lord Mayor, who had, besides him, twenty-one children. In 1483 he was sent to Magdalen College, Oxford, where he passed seven years, and took the usual degrees in arts. Here he studied Latin, with some of the Greek authors, through a Latin medium, and mathematics. Having thus laid a good foundation of learning at home, he travelled abroad for further improvement: first to France, and then to Italy, in which two countries he continued from 1493 to 1497. Before his departure however, and indeed when only of two years standing in the university, he was instituted to the rectory of Denington in Suffolk, being then in acolythe's orders, to which he was presented by a relation of his mother, and which he held till his death. His father also presented him in 1485 to the rectory of Thyrning, in Huntingdonshire, which he resigned in 1493. At Paris he became acquainted with Budæus, and was afterwards introduced to Erasmus. In Italy he contracted a friendship with numerous eminent persons, and especially with some of his own countrymen, among whom were Grocyn, Linacre, Lilly, and Latimer, all of whom were studying the Greek language, then but little known in England. Whilst abroad he devoted himself chiefly to divinity and the study of the civil and canon law. During his absence from England he was made a prebendary of York in 1497, and was also made a canon and prebendary of St. Martin's-le-Grand in London. He returned in this year, and was ordained deacon; taking priest's orders in the following year. Soon after this he retired to Oxford, where Erasmus came, and renewed his friendship with him. In Oxford he read public lectures upon St. Paul's Epistles gratuitously. In 1502, having proceeded in divinity, he became prebendary of Durnford in the church of Salisbury, and in 1504 resigned his prebend at St. Martin's-le-Grand. In the same year he commenced D.D. In May, 1505, he was instituted to the prebendary of Mora in St. Paul's, London, and in the same year and month was appointed Dean. In this office he reformed the decayed discipline of his cathedral, and introduced a new practice of preaching himself upon Sundays and great festivals. By his own, and by other lectures which he caused to be read there, he mainly assisted in raising that spirit of inquiry after the holy Scriptures which eventually produced the Reformation; but the contempt which he avowed for the abuses in religious houses, his aversion to the celibacy of the clergy, and the general freedom of his opinions, made him obnoxious to some of the clergy, and especially to Fitzjames, then bishop of London, who accused him to Archbishop Warham as a dangerous man, and even preferred articles against him. Warham however dismissed the case. From Bishop Latimer's sermons it should seem that Fitzjames afterwards tried to stir up the king and court against him. Tired with trouble and persecution, Colet began to think of retiring from the world. He had now an ample estate, without any near relations, for numerous as his brethren had been, he had outlived them all. He resolved therefore, in the midst of life and health, to consecrate his fortune to some lasting benefaction, which he performed in the foundation of St. Paul's School, of which he appointed William Lilly first master in 1512. He ordained that there should be in this school a high master, a sur-master, and a chaplain, who should teach gratis a hundred and fifty-three children, divided into eight classes; and he endowed it with lands and houses then producing an income of 122*l.* 4*s.* 7½*d.* per annum, of which endowment he made the Company of Mercers trustees. The gross average income of St. Paul's School is now about 5300*l.* per annum. (Carlisle's *Grammar Schools*, vol. ii. p. 94.) To further his scheme of retiring, Colet built for himself a handsome house near the royal palace of Richmond in Surrey, in which he intended to reside, but having been seized by the sweating-sickness twice, and relapsing into it a third time, a consumption ensued, which proved fatal, Sept. 16, 1519, in his fifty-third year. He was buried in St. Paul's choir, with an humble monument which he had himself prepared some years before, bearing simply his name. Another monument was afterwards set up for him by the Mercer's Company, of a handsomer description; but it was destroyed in the fire of 1666. It had previously been engraved for Dugdale's 'History of St. Paul's.' Dean Colet's works were, 1. 'Oratio ad Clerum in Convocatione,' anno 1511; reprinted by Dr. Samuel Knight, in the appendix to his Life of Colet, with an old English translation of it, supposed to have been done by the author himself. 2. 'The con-

struction of the Eight Parts of Speech, entitled Absolutissimus de octo Orationis partium constructione Libellus,' 8vo. Antw. 1530. 3. 'Rudimenta Grammatices,' for the use of his school, commonly called 'Paul's Accidence,' 8vo. 1539. 4. 'Daily Devotions;' said not to be all of his composition. 5. 'Monition to a godly Life,' 8vo. 1534, &c. Many of his letters are printed in Erasmus's Epistles, and five, with one from Erasmus, in the appendix to Knight's Life. The original Statutes of St. Paul's School, signed by Dean Colet, were, some years ago, accidentally picked up at a bookseller's, by the late Mr. Hamper of Birmingham, and by him presented to the British Museum. (Knight's *Life of Dr. John Colet*, 8vo. Lond. 1724; Wood's *Athenæ Oxon.*; Chalmers's *Biogr. Dict.*, vol. x., pp. 31-36.)

COLIBRI. [HUMMING BIRDS.]

COLIC, (from κῶλον, *colon*,) *dolor colicus*, called by Sydenham and the old English writers the dry belly-ache; a disease attended with severe pain of the bowels, remitting and recurring at intervals, with constipation, and without fever. The seat of this malady is conceived to be chiefly, if not entirely, in that portion of the large intestines called the colon, and hence its name. It arises from a great variety of causes, and assumes a corresponding variety of forms, many of which have received distinct names; but pain and constipation of the bowels, with the absence of fever, are common to them all; and this concurrence of symptoms is essential to the medical notion of colic.

The pain in colic often most distinctly follows the course of the colon, while the morbid distension and contraction of the bowel (for these two morbid states alternate with each other, and attack successively different portions of the intestine) often become visible to the eye. The colon receives all that portion of the food which is not converted into chyle, together with all those portions of the pancreatic, biliary, and intestinal secretions, which do not form component parts of the chyle. Consequently it has a considerable mass of matter to carry downwards and convey out of the system. It is provided with muscular fibres, very much larger than those which belong to the small intestines. These fibres form three large bands, which are placed in a longitudinal direction along the intestine, and which produce the effect of dividing the inner surface of the colon into folds, so disposed as to form little distinct apartments called cells. In these cells the feculent matter, which should be slowly but progressively carried downwards, is sometimes collected and closely impacted, so that when at length rejected it has the form of those cells constituting hard rounded balls, termed *scybalæ*. The natural stimulus to the muscular fibres of the colon is the resinous portion of the bile [BILE], together with the non-nutrient portion of the aliment. It is easy then to conceive how a loss or diminution of the contractile power of these fibres may occasion the constipation incident to colic, attended with the retention of the feculent matter in the cells of the colon; how a suppression or an altered condition of the bile may contribute to the same effect; and how an acrid quality of the bile and of the non-nutrient portion of the aliment may produce the irritation and pain incident to colic. The colon then, both from its structure and function, it is obvious must be peculiarly predisposed to such an affection as that to which, from the frequency with which it is the subject of the malady, it has given a name. It is perhaps desirable that the term colic should be restricted to the designation of a disease of a definite character, seated in the colon; and some medical writers do so limit the use of the term, though others give it a more extended signification, and with less propriety include under it diseases which do not arise primarily in the colon, but in some neighbouring organ, the colon being only secondarily and sympathetically affected.

Colic, properly so called, is attended with severe griping pains in the bowels, which often follow very accurately the course of the colon; sometimes having their seat in one portion of it and sometimes in another. These pains remit for a time, affording intervals of ease; but they soon return with increased violence. They are often relieved by pressure, a character by which they are distinguished from pain occasioned by inflammation, the latter being always increased by pressure. The pain is usually attended with a greater or less degree of flatulence. The flatus sometimes collects to such an extent as to occasion a prodigious dilatation of the bowels, greatly increasing the pain. When the digestive process is perfectly natural, it is always attended with the evolution of some portion of gas; in disordered states of digestion, the quantity of gas is often very much increased. But in colic the quantity generated is sometimes greater than can possibly be derived from this source; there would appear to be an actual generation of a gaseous fluid, probably from the blood. While one portion of the intestine is thus preternaturally distended, another portion is in a state of preternatural contraction, from the irregular spasmodic action of the muscular fibres of the colon, excited by the irritating cause—whatever it may be—which produces the disease. These irregular spasmodic contractions of the colon are always present when this disease is severe, and are intensely painful. The constipation, which is so constant as to be a diagnostic character of the malady, is often long continued and obstinate, and the consequent accumulation of feculent matter is very great. To the preceding train of symptoms is very frequently superadded vomiting, which is often urgent and most distressing; and in cases of the greatest severity, the action of the whole intestinal tube above the seat of the disease is inverted, and the fæces are mixed with the matter vomited. Occasionally there is hiccough, and very often the griping pains are attended with loud rumbling noises in the interior of the intestines.

It is unnecessary in this place to enter into the details of the varieties of this malady to which physicians have assigned distinct names, since these varieties are merely modifications of the same disease produced by different causes. The preceding account will be sufficient to give to the general reader a distinct conception of the nature of the malady, and of the causes which produce it; and it is only necessary to observe respecting the treatment, that the two great principles on which the cure depends are the complete evacuation of the intestine, and the strict regulation of the diet. It is indispensable that the evacuation of the intestine of its accumulated and irritating contents should be complete, and this is best affected by an alternation of mild and unirritating aperients, with opiates. After the intestine has been fully relieved of its load, it is necessary to persist in a course of mild aperients for a considerable time; because the bowel long remains in an irritable state, and very slight causes are apt to occasion a relapse. For the same reason only the most bland and unirritating substances should be taken as food; all acid and acrid matters in the solid and all stimulating matters in the fluid aliment should be most carefully avoided.

COLIGNY, GASPARD DE, born in February, 1516, was the son of Gaspard de Coligny, lord of Châtillon-sur-Loing and marshal of France, and of Louise de Montmorency, sister to the famous duke and constable of that name. Coligny served in Italy under Francis I., and was present at the battle of Cerisoles. Henry II. made him Colonel-General of infantry, and afterwards, in 1552, Admiral of France. In the latter capacity he sent a colony to Brazil, which however was soon after driven away by the Portuguese. Coligny himself continued to serve in the army by land. He defended St. Quentin against Philip II., and was made prisoner at the surrender of the place. Having embraced the reformed religion, he became, with Louis prince of Condé, one of the great leaders of the Protestant party against Catherine de' Medici and the Guises, during the reign of Charles IX. Coligny was much respected by his party: he was prudent in his plans and cool in danger; defeat did not dishearten him, and he rose again after it as formidable as ever. After the loss of the battle of Dreux, in which Condé was taken prisoner, Coligny saved the remains of his army. The following year peace was made, but in 1567 the civil and religious war broke out again, and the battle of St. Denis was fought, in which the old Constable Montmorency, who commanded the royal or Catholic army, was killed. A short truce followed, but hostilities broke out again in 1569, when the battle of Jarnac was fought, in which the prince of Condé was killed. Coligny again took the command and saved his army, which was soon after joined by the prince of Béarn (afterwards Henry IV.), then sixteen years of age, and Henry the son of Condé, who was but seventeen. The prince of Béarn was declared the head of the Protestants, but Coligny exercised all the functions of leader and commander. On the 3rd of October, 1569, Coligny lost the battle of Moncontour, against the duke of Anjou (afterwards Henry III.). Still Coligny continued the war south of the Loire, gained several advantages, and at last a peace was

concluded at St. Germain in August, 1570, which was called ‘la paix boiteuse et mal assise,’ because it was concluded by the Sieur de Biron, who was lame, and by De Mesmes, lord of Malassise. The peace however fully deserved its nickname, by the spirit in which it was concluded by the Court. The leaders of the Protestants, and Coligny among the rest, entertained strong suspicions on the subject, but they were lulled into security by the apparent frankness of Charles IX., and the approaching marriage of the prince of Béarn with the Princess Margaret, the king's sister. Coligny came to Court, and was well received, but on the 22nd of August, 1572, he was shot at in the street by an attendant of the duke of Guise. The wounds however did not prove dangerous. The attempt was made at the instigation of the duchess of Nemours, whose first husband, Francis duke of Guise, had been assassinated by a Huguenot fanatic at the siege of Orléans in 1563, when Coligny was unjustly suspected of having directed the blow. On the 24th of August, 1572, two days after the attempt upon Coligny's life, the massacre of ‘la Sainte Barthélemi’ took place. [BARTHOLOMEW, MASSACRE OF.] The duke of Guise himself led the murderers to the house of the admiral, but remained in the court below, while Besme, one of his servants, went up followed by others. They found Coligny seated in an armchair; ‘Young man,’ said he to Besme, ‘you ought to respect my grey hairs; but do what you will, you can but shorten my life by a few days.’ They stabbed him in several places, and threw him, still breathing, out of window into the court, where he fell at the feet of the duke of Guise. His body was left exposed to the fury of the populace, and at last was hung by the feet to a gibbet. His head was cut off and sent to Catherine de' Medici. Montmorency, cousin to the admiral, had his body secretly buried in the vaults of the château of Chantilly, where it remained in a leaden coffin till 1786, when Montesquieu asked for the remains of Coligny from the duke of Luxembourg, lord of Châtillon, and transferred them to his own estate of Maupertuis, where he raised a sepulchral chapel and a monument to the memory of the admiral. After the revolution the monument was transferred to the Musée des Monumens Français, and a Latin inscription was placed upon it by M. Marron, the head of the Protestant consistory at Paris. (Coligny's biography in the *Hommes Illustres de France*, and *Dictionnaire Universel Historique*, art. ‘Coligny.’)

COLISE'UM, properly COLOSSEUM. [AMPHITHEATRE.]

CO'LIUS. [FRINGILLIDÆ.]

COLLATERALS. [CONSANGUINITY.]

COLLATION. [BENEFICE.]

COLLE'GIUM, or CONLE'GIUM, from the word ‘colligo,’ ‘to collect or bring together,’ literally signifies any association or body of men. The word Corpus was also used in the same sense, and those who were members of a collegium or corpus were hence called corporati. The word Universitas was sometimes used as equivalent to Collegium or Corpus, but it had also the more general signification of ‘community,’ or ‘collective body of citizens.’ In the Roman polity collegium signified any association of persons such as the law allowed, and which was confirmed by special enactment or by a senatus consultum, or an imperial constitution, in which case it was called Collegium Legitimum. A collegium necessarily consisted of three persons at least. (*Dig.* 50, tit. 16, l. 85.)

In general, any association or collegium, unless it had the sanction of a senatus consultum, or of the emperor, was illegal (illicitum); but when dissolved, the members were allowed to divide the property of the association according to their respective shares. The members of a collegium were called sodales: the terms and object of their union or association might be any that were not illegal.

A great variety of collegia (many of them like our companies) existed at Rome and in the empire, as we see by antient writings and inscriptions, such as the Collegia Fabrorum, Pistorum, Pontificum, Fratrum Arvalium, Virorum Epulonum, Augurum, &c. Some of these, such as the colleges of Pontifices and Augurs, were of a religious character. These collegia possessed property as a corporate body; and in the time of the emperor, M. Antoninus, if they were collegia legitima, they could take a legacy or bequest (*Dig.* 40, tit. 5, l. 20) in their corporate capacity. Collegia were allowed, as a matter of course, to have a common chest, and an actor, syndicus or attorney, to look after their rights and interests, and appear on their behalf. (*Dig.* 3, tit. 4, l. 1.) The maxims, that what was due to a university was not due to the individual members, and that the debts of universities were not the debts of the individual members, and that even though all the members were changed, the university still existed, comprehend the essential notion of a corporation as now understood. In most cases the members probably filled up vacancies in their own body; as to the mode of election in the college of Augurs, see AUGURS.

In England a COLLEGE is an eleemosynary lay corporation, of the same kind as an hospital, existing as a corporate body either by prescription or by the grant of the king. It is not necessarily a place of learning. An hospital also is not necessarily a mere charitable endowment, but is sometimes a place of learning, as Christ's Hospital, London. Its particular form and constitution depend on the terms of the foundation. A college consists of a head, called by the various names of provost (præpositus), master, rector, principal or warden, and of a body of fellows (socii), and generally of scholars also, besides various officers or servants, according to the peculiar nature of the foundation. A college is wholly subject to the laws, statutes, and ordinances which the founder makes, and to the visitor whom he appoints, and to no others. All elections, and the general management of a college, must be in conformity with such statutes or rules. If a college does not exceed its jurisdiction, the king's courts have no cognizance, and expulsion of a member is entirely within its jurisdiction. If there is no special visitor appointed by the founder, the right of visitation, in default of the heirs of the founder, devolves upon the king, who exercises it by the great seal. When the king is founder, his successors are the visitors.

The general power of a visitor is to judge according to the statutes of a college, to expel and deprive for just reason, and to hear appeals. His precise powers are determined by the founder's statutes, and if there are any exceptions to his power, the jurisdiction in such excepted cases devolves on the king. Certain times are generally named in the statutes for visitation, but the visitor may visit whenever he is called in, it being incident to his office to hear complaints. So long as a visitor keeps within his jurisdiction his acts cannot be controlled, and there is no appeal from him, as was decided in the well-known case of Philips *v.* Bury, or the case of Exeter College, Oxford. (Show. P. C. 35). The visitors are not bound to any particular forms of proceeding, and, in general, want of jurisdiction is the only ground on which they are liable to prohibition. If a visitor's power is not limited or defined, he must use his best discretion. If a power to interpret the statutes is given to any person, as to the bishop of the diocese, this will constitute him and his successors visitors. The heirs of a founder cannot alter the statutes, unless such a power is expressly reserved; and it appears, that where the king is founder, his successors cannot alter statutes without the consent of the college, unless such a power is reserved. But as to the power to alter statutes, it must be observed, that in the case of the crown at least, it has not unfrequently been done, though such a power might now possibly be disputed, unless expressly reserved to the founder and his heirs by his original statutes.

Whenever a visitor is appointed, the Court of Chancery never interferes with the internal management of a college; but this court exercises jurisdiction on all matters pertaining to the management of the funds, considering that as to the funds of a college, those who possess the legal estate are in the situation of trustees. If governors, or persons called visitors, have the legal estate, and are intrusted with the rents and profits, the Court of Chancery will make them account. In colleges, when a new foundation is engrafted on the old one, it becomes part of the old one, and subject to the same visitorial authority, unless new statutes are given with the new foundation.

The validity of all elections in colleges must be determined by the words of the founder's statutes or rules. In the disputes that have arisen on elections, the point has generally been, whether the master's concurrence is necessary, or whether a bare majority of the electors, of which electors the master is one, is sufficient. In Catharine Hall, Cambridge, fellows must be elected ‘communi omnium consensu aut saltem ex consensu magistri, et majoris partis communitatis;’ and it was held by Lord Eldon, upon these words and another clause which follows, that no election was valid in which the master did not concur.

The statutes of Clare Hall, Cambridge, require ‘that the

election of a fellow shall be by the master and the major part of the fellows present'; and here it was held (A.D. 1788) that a valid election might be made without the concurrence of the master. But this interpretation is obviously wrong, and is referred to with disapprobation in the recent case of Queen's College, Cambridge, 5 Russell.

Colleges (13 Eliz., c. 10), cannot grant leases of their land beyond 21 years, or three lives; and in such leases the accustomed yearly rent, or more, must be reserved, payable yearly during the term. By 18 Eliz., c. 6, in all leases made by colleges in the universities, and by the colleges of Winchester and Eton, one-third of the whole rent must be reserved in corn. The Mortmain Act of 9 Geo. II., c. 36, which has put considerable obstacles in the way of gifts of land or money to be laid out in land in England, for charitable purposes, does not extend to the two universities of Oxford and Cambridge, or to colleges in the two universities, nor to gifts in favour of the scholars of Eton, Winchester, and Westminster. This statute contained a restriction as to the number of advowsons which a college in either of the universities was allowed to hold; but this restriction was removed by 45 Geo. III., c. 101, having been found, as the preamble to this statute sets forth, injurious to learning. These colleges can therefore now purchase and hold as many advowsons as they please.

A collegiate church is a church that has a college or chapter of canons, but no bishop, and yet is under the authority of a bishop. The canonists require three canons at least to constitute a collegiate church, because three, according to the Roman law, were required to make a college. These collegiate churches are sometimes simply called colleges. In the case of Manchester College, a mandamus was directed to the bishop of Chester, as warden of Manchester College, to admit a chaplain. The bishop happened also to be visitor of the college. It was held by the King's Bench, that in the case of a spiritual corporation the jurisdiction was in that court, unless there was an express visitor appointed, and the court interposed in the present case because there was no separate visitorial power then existing, owing to the union of the wardenship and visitorship in the same person. This case was afterwards provided for by an express Act, 2 Geo. II., c. 29.

As to the relation between the English universities and the colleges within their limits, see UNIVERSITY and CAMBRIDGE and OXFORD. The nature of a college in the English universities, considered simply in itself, will be best understood by referring to the particular accounts of colleges in this work, as Brasenoze, All Souls, Balliol, &c.

The statutes of all the old colleges in England are in Latin; and, indeed, with the exception of some comparatively modern endowments, probably all college statutes are in Latin. Those of Eton College, of Trinity College, Cambridge, and of St. John's College, Cambridge, which may serve as specimens of the statutes of such foundations, are printed in the Education Reports of the House of Commons, 1818.

Meiners (*Geschichte der Enstehung und Entwickelung der Hohen Schullen*, &c., Göttingen, 1802, vol. i.) has given an interesting chapter on the origin of colleges in universities. The colleges in the University of Paris were the first institutions of the kind in Europe, though it is a mistake to suppose them older than the university itself.

The terms college and university have been often confounded in modern times, and indeed are now sometimes used indiscriminately. Some of the incorporated places of learning in the United States, which confer degrees, are called universities, and some are called colleges, though there is in fact no distinction between the two. Some of these institutions called colleges contain the schools or departments of arts, law, medicine, and theology; and some that are called universities contain only those of arts, law, and medicine. Some of these colleges are more limited as to the objects of instruction, but still confer degrees. If we look to the origin of colleges and their connexion with universities, it will be evident that the indiscriminate use of these terms is incorrect, and tends to lead to confusion. When an incorporated college, such as the College of Surgeons in London, is empowered to confer a degree or title after examination of candidates in a single department, some other name would be more appropriate. The word Academia, which is the most modern of all the terms applied to places of higher instruction, has been most usually applied to endowed corporate bodies which have for their object the improvement of some particular science or some particular branch of knowledge, in some cases with the power to confer degrees in such particular science, &c., and sometimes without this power. Yet the terms academia and university have also often been used, and now are used indiscriminately. (Meiners, vol. iv., *On the Different Names of High Schools.*)

The history of the Scotch universities shows that the terms college and university were, both at the time of the foundation of these institutions and subsequently also, used with little discrimination; and this carelessness in the application of the terms has led to anomalies in their constitution, and no little difficulty in comprehending the history and actual constitution of these bodies. (See the *Report of the Royal Commission of Inquiry into the State of the Scotch Universities*, printed 1831; and Malden's *Origin of Universities*, London, 1835.)

In France, the term college signifies a school, though the constitution of a French college is very different from that of our grammar-schools. It comes nearest, perhaps, to a German gymnasium. Of these colleges there are about 320, every large town having one of them. They are maintained by the towns, their heads and professors being paid out of the revenues of the communes. They are all under the superintendence of the University of France. There are also about forty royal colleges, in which the directors (*administrateurs*) and professors are paid by the state. The College Royal of France, founded by Francis I., has above twenty professors, who lecture on the various sciences and the oriental languages. (See *Journal of Education*, No. III 'On the State of Education in France.')

COLLIER, JEREMY, was born on the 23rd of September, 1650, at Stow Qui in Cambridgeshire. He was educated under his father, who was master of the free-school of Ipswich. In 1669 he was admitted of Caius College, Cambridge, and in 1676 took the degree of M.A. He resided some time as chaplain with the countess dowager of Dorset, and then received the small rectory of Ampton, in Suffolk. In 1685 he resigned this living and came to London, when he was soon appointed lecturer of Gray's Inn. At the revolution of 1688 he put himself in opposition to the government and the church as established under William III., and engaged in a hot controversy with Burnet, afterwards bishop of Salisbury. One of his publications, 'The Desertion Discussed, in a Letter to a Country Gentleman,' (4to. 1688) gave great offence to the new government, and Collier was sent a close prisoner to Newgate, where he remained some months, and whence he was, at last, discharged without ever being brought to trial. This persecution did not cool his zeal: during the four following years he published a number of works, which were all of a political and controversial nature. Towards the end of 1692 Collier, with Newton, who was also a non-juring clergyman, was arrested at a solitary place on the Kentish coast, whither he was supposed to have gone for the purpose of communicating with the partisans of the house of Stuart on the other side of the water. After a short examination before the earl of Nottingham, secretary of state, he was committed to the Gate-house. There was no evidence against him; but in consequence of his questioning the legality of the courts, and refusing bail, he suffered a short imprisonment in the King's Bench.

In the course of 1692 and 1693 he published six more works, all hostile to government. In 1696 he was prosecuted for giving church absolution to Sir John Friend and Sir William Perkins, who were convicted of being accessories in the plot to assassinate King William. Collier absconded and was outlawed. The outlawry was never revoked, but the energetic divine, after the first rigour was abated, seems to have cared little for it. He lived in London or its suburbs till his death, supporting himself by his literary labours. In the course of the very year in which he was outlawed he put forth five political works. The next year he published the 1st volume of his 'Essays upon several Moral Subjects,' adding a 2nd vol. in 1705, and a 3rd in 1709. These essays were much admired at the time. It was, however, in 1698 that he produced the work by which he is now best known: 'A Short View of the Immorality and Profaneness of the English Stage, together with the Sense of Antiquity upon this Argument,' 1 vol. 8vo. The 'Short View' was almost as severe upon theatres and theatrical writers as Prynne's famous 'Histrio-Mastix,' published about 65 years before. It led to a controversy with Con-

greve and Vanbrugh, in which many sheets were printed on both sides, many hard names exchanged, and in which Collier, to whom contest was a delight, is thought to have had the better of his adversaries. After three other defences of his 'View,' he published, in 1703, 'Mr. Collier's Dissuasive from the Play-house, in a Letter to a Person of Quality, occasioned by the late calamity of the Tempest.' This literary combat lasted ten whole years; but Collier lived to see the English stage become much more decent than it had been—an improvement to which he had doubtlessly contributed.

Between the years 1701 and 1721 he translated and published Moreri's great 'Historical Dictionary,' and wrote and published 'The Ecclesiastical History of Great Britain,' in two huge folio volumes. The history was attacked by Bishop Burnet and others, to whom Collier replied with his usual vigour. He was the author of a few other religious and controversial papers. He died on the 26th of April, 1726, in the 76th year of his age, and was buried in the church-yard of St. Pancras, London.

COLLIMATION, LINE OF, the line of sight in any astronomical or geodesical instrument. [Circle.] Where a telescope is used, this name is given to the line joining the centre of the object-glass and the intersection of the fine wires or spiderwebs in its focus, this being the direction of any object which is there seen bisected by the observer.

COLLIMATION, ERROR OF. In most instruments the line of sight is supposed to have a certain relation to other parts. Thus in a transit telescope it ought to be perpendicular to the horizontal axis, in a circle or quadrant it should be in a horizontal or vertical direction when the reading of the limb is 0° or 90°. When this is not the case, the difference between the existing and required positions is called the *error of collimation*, which must be carefully ascertained, and be corrected or allowed for, or eliminated in the mode of conducting the observations. This will be particularly explained as each instrument comes under our notice. Many readers will have a general notion of the error of collimation from the mode in which a workman tries the truth of his square, or of the mason's level, which in principle is nearly allied to the methods of astronomers. When the telescope was originally applied to astronomical instruments, the mystery of ascertaining the true direction of a line which could not be mechanically examined, presented considerable difficulties to some observers. Hevelius of Danzig never could be induced to apply telescopic sights to his sextants or quadrants, and in consequence of this prejudice much of the labour of his long and active life was completely wasted.

COLLIMATOR, the name given by Captain Kater to his contrivance for determining the error of collimation in any principal instrument, without the reversal of the instrument itself. This reversal troublesome in all large instruments, and in mural circles and quadrants is forbidden by their construction. We shall give a sketch of Captain Kater's collimators and those antecedent to his invention, and a drawing and description of a *level* collimator, which on the whole we think best suited for common use. Where the adjustments, &c., mentioned are not described, the reader will find them in the article Circle.

On referring to the description of each instrument, it will be seen that the determination of the error of collimation requires—1. a well-defined object, of which the direction remains unchanged; 2. a reversal of the instrument, similar to that of the mason's level; 3. for angular instruments, a power of determining the relation of the direction of that object to a vertical line. Now a near object cannot be seen on the wires of a telescope when they are in the focus of the object-glass, and a distant object is very seldom sufficiently steady or sharply defined. This want may be supplied by a second telescope, having its axis parallel to the axis of the telescope under examination and nearly in the same right line, which has cross wires in its focus; the object-glasses being towards each other. As parallel rays falling on an object-glass converge to the focus, so rays diverging from the focus become parallel after refraction at the object-glass, and emerge as if they came from a real object at an infinite distance; hence the cross wires in the supplementary or collimating telescope will be seen distinctly in the direction of the line joining the cross and the centre of the object-glass, in whatever part of the cylinder of issuing rays the eye may be placed. Great care is requisite in adjusting the wires of the collimating telescope exactly to focus, especially if a short telescope be used; but the axes of the two telescopes need only be approximately in a right line.

In many of the private observatories in England, a metal plate with sharp lines or dots engraved upon it, is firmly secured to an outside stone and viewed through a lens fixed in the wall of the observatory, the distance between the lens and the mark being equal to the focal distance of the lens. It is evident that such a mark may be used for determining the error of collimation in altitude of a reversible circle, and in all cases where merely a distinct and distant object is required. If the position of the mark be permanent, and the focal length of the lens be considerable, this may be advantageously used as a *meridian mark* [Transit]; but then the lens should have a separate support within the observatory, and the position of the mark should be jealously watched and verified. Dr. Rittenhouse first made use of this substitute for a distant mark (*American Philosophical Transactions*, vol. ii. p. 181); and we believe Dr. Maskelyne at one time used an adaptation of the same principle, viz., a cap with a lens of long focus, slipping over the object end of his transit telescope, to view the south meridian mark at Greenwich, which was too near the observatory to be seen distinctly

The collimating telescope and its cross wires are thus made to supply the want of a distinct, distant, and immovable object. In the *Astronomische Nachrichten*, No. 43, Professor Gauss, after enunciating the optical property above mentioned, used it for measuring the intervals between the wires of a transit telescope by a theodolet, which viewed them through the object-glass of the transit. In No. 61 of the same work, Professor Bessel applied the same principle to a still more important purpose, that of determining the horizontal flexure of the telescope of his meridian circle. After taking out the object-glass and eye-piece of this instrument (or the instrument might have been raised out of the way), he placed two collimating telescopes, one to the north and the other to the south of the circle, looking into each other, and nearly in the horizontal line which passed through the centre of his instrument. These he adjusted to have their cross wires apparently upon each other, when the two object-glasses and the two crosses are evidently all in the same right line. The object-glass and eye-piece were then replaced in the circle telescope, and the angle between the two crosses of the collimator measured, which would have been exactly 180°, without flexure; hence the difference from 180° was the double horizontal flexure of the circle telescope. Bessel further remarks, that a vertical telescope turning freely round in its collars, and having a cross level attached, might be used for determining the true zenith point of any instrument, without reversing the latter. The date of this publication is July, 1824.

Captain Kater, who had not heard of either of these memoirs, gave, in the *Philosophical Transactions*, 1825, p. 147, a description and figure of a *horizontal floating* collimator. This is a telescope laid horizontally upon a block of cast iron, which floats in a vessel filled with mercury. This collimator was designed for determining the *zenith point* of mural and other irreversible circles. The cross of the collimating telescope is observed by the circle telescope in one direction, suppose to the north, and the divisions read off. The trough of mercury with the collimator floating in it, is then transported to the south of the circle, the cross again bisected, and the divisions read off as before. If the angle which the line of sight of the collimating telescope makes with the horizon be supposed to be unchanged by this change of place, it is clear that half way between the means of the two sets of readings is the reading corresponding to the vertical position of the circle telescope. Again, as the difference of the north and south mean readings would equal 180°, if the collimating telescope were truly horizontal, half the excess of this difference above 180°, or half the defect from 180°, will be the angle which the collimating telescope makes with the horizon. We believe however that, in addition to the trouble of moving such an apperatus, the permanence of the position of the collimating telescope could not be relied upon if at all disturbed.

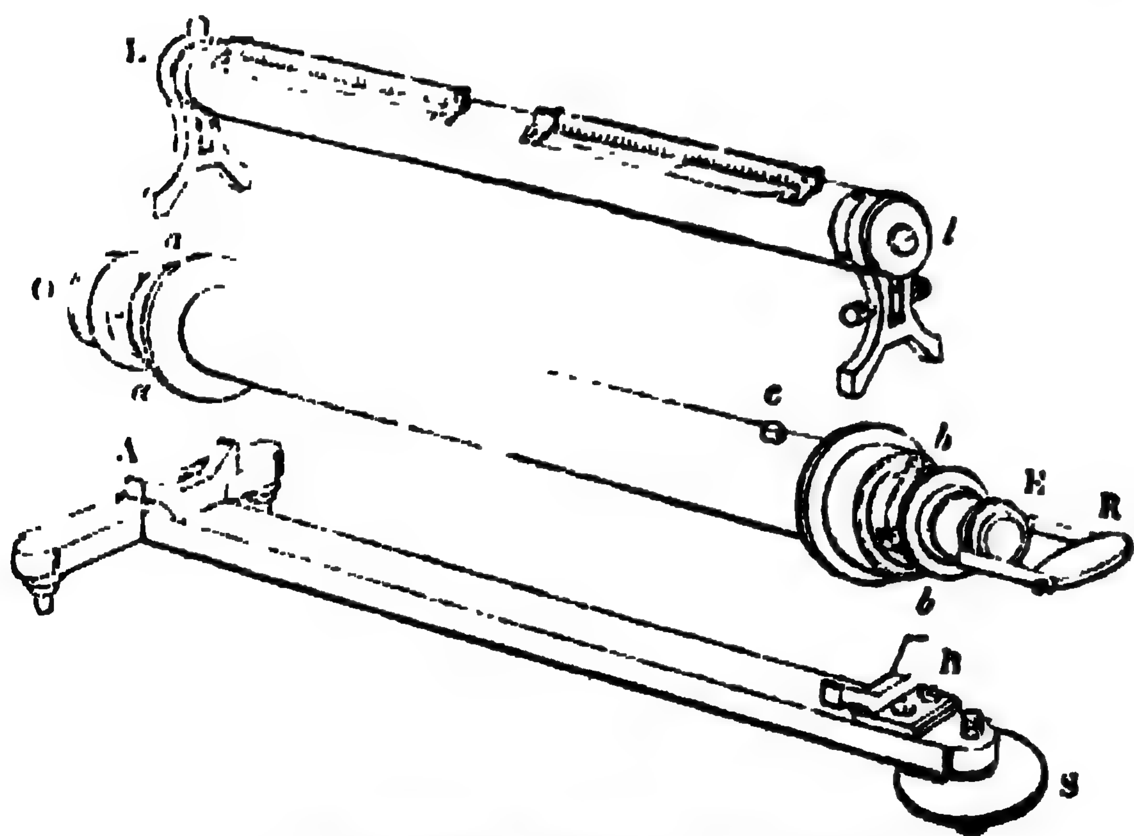
In the *Philosophical Transactions*, 1828, p. 257, Captain Kater proposed a very much improved form of this in

strument, which he called the *vertical* floating collimator. The iron float is here a ring swimming in an annular trough, and the telescope, which is placed vertically, has a clear view through the centre of the float and trough. This collimator may be placed below the instrument to be examined, when the collimating telescope will have its object-glass uppermost, or, as is most usual, above the instrument, when the collimating telescope looks downwards. A smooth rotatory motion upon rollers can be given to the annular trough, when it is evident the line of sight of the collimating telescope will either be and continue to be vertical (supposing the position of the float to be permanent), or will describe a conical surface of which the axis is vertical. Hence if the cross be bisected in two opposite positions of the collimator by the telescope of a circular instrument, the mean of the two readings will be the reading of the zenith of the instrument.

It will, generally speaking, be convenient to adjust the axis of the collimating telescope truly vertical. To do this, first observe the position of the cross by a circle or transit telescope, turn the collimator half round, and note the position again; then, by placing a small weight upon the float, bring the cross half way between the two observed positions. Turn the collimator a quarter round and perform the same adjustment for this and its reversed situation. The axis of the collimating telescope is now truly vertical. From some trials, which however we must admit were not made under favourable circumstances, we do not think the vertical floating collimator capable of giving results as accurate as may be obtained by other means; but it ought also to be stated that there is a good deal of difference of opinion among practical astronomers upon this point.

In the accompanying figure we have represented a more portable, and perhaps a more accurate instrument for determining the error of collimation, and also the position of the horizon, than either of the floating collimators.

The three parts of which this collimator consists have been separated from each other for easier comprehension. The telescope O E rests with its ground cylindrical collars, *a a*, *b b*, in the rectangular Y's, A, B of the stand. These collars should be truly cylindrical, and, if possible, exactly equal. There are cross wires which must first of all be placed correctly in the focus of the object-glass, when the screw *c* is to be tightened. To adjust the cross-wires, bring the intersection of the cross to bisect any distinct and immovable object (the wires of another telescope,



[Level Collimator, Troughton and Simms.]

for instance), turn the telescope half round in its Y's, and then, by releasing one of the four adjusting screws, (the heads of which are seen near *b b*,) and screwing up its antagonist, bring the cross *half way* back to coincidence, and complete the coincidence by screwing S. When this has been done satisfactorily, adjust the cross in the transverse direction by the other two screws, and it will then be found that the telescope can be turned round without any apparent change of place in the cross wires, that is, the line of sight is in the axis of the collars or parallel to the axis. The reflector R, which is merely to throw the light of the sky or a lamp upon the wires, may now be put on.

The collimator being thus adjusted, is to be set to the north or south of the circle under examination, and at the same height as the centre of the telescope, when the axis of the collars is to be made horizontal by the reversible level *L l*, and the foot screw S. When the cross of the collimator is bisected by the wires of the circle telescope, the telescope is horizontal, and the mean reading of the circle microscope is the reading of the *horizontal point*, which, if the circle reads altitudes, should be 0°, and if zenith distances, should be 90°. The difference from these values is the error of collimation. By setting the collimator to the other side of the instrument any error of flexure may be detected.

We have said that the cylindrical collars should be perfectly equal, but it is not easy to make them so. The difference is easily ascertained by reversing the telescope in its Y's, end for end, and again applying the level. Suppose the level to have shown perfect horizontality before reversing, and that afterwards the reading towards O exceeds that towards E, by m''. It will easily be seen that $\frac{m''}{4}$ must always be *subtracted* from the indications of the level towards O. It is equally evident, that if, after the above correction is made, the object end O appears too high by n'', that the true angle with the vertical is $90 + n''$, or that the reading of the circle should show n'' of depression. The different cases which may occur present no difficulty. If the collars are truly cylindrical and the level a delicate one, such a collimator should show the true horizontal point within 1″. The telescope should not be very small, not less than 12 inches.

It would scarcely be just not to notice under this head an instrument by Roemer, which has as much merit, as an invention, as any of these which we have described. It consists of two equal lenses fixed in a tube at a distance somewhat exceeding their focal length, with a system of wires in the focus of each, between the glasses. By applying the proper eye-piece at each end, the near wires, and consequently objects through the most distant object glass, are made visible. The two object-glasses and the crosses of the wires being all adjusted in the same straight line, it is evident that, on looking in at each end of the tube, objects 180° apart will be seen on the crosses. Roemer called this tube an *amphioptron*, or *reciprocal telescope*, and used it for the transit adjustment in collimation of his *rota meridiana*. (Horrebow, *Basis Astronomiæ*, p. 97.)

For further details, see Pearson's *Practical Astronomy*, vol. ii., p. 446, plate xxi.

COLLIN, KOLIN, or NEU-KOLIN, a town in the Bohemian circle of Kaurzim, situated on the Elbe. It lies in 49° 59′ N. lat., 15° 10′ E. long., and contains 420 houses and about 5800 inhabitants, among whom are numbers of Jews. Large quantities of garnets, topazes, and cornelians are found in the vicinity, and polished here. In the neighbourhood, between the castle of Chotzemitz and the village of Planian, general Daun, the commander of the Austrian army, gained the famous victory over Frederick the Great on the 18th of June, 1757.

Collin contains a haupt-schule, or grammar school, and a manufactory of potash and one of cottons; a monastery of Capuchins, a church and a town-hall, both in the Gothic style, and a castle with grounds and a botanical garden attached to it. The town is well built, surrounded by walls, and finely placed upon an elevated rock, beneath which the Elbe has a considerable fall.

COLLINGWOOD, CUTHBERT, ADMIRAL LORD, was born on the 26th of September, 1750, at Newcastle-upon-Tyne. At the age of eleven he was sent to sea, as a midshipman, under the care of Captain, afterwards Admiral Brathwaite, who was the son of his mother's sister, and who seems to have taken extraordinary pains in giving him nautical knowledge. After serving some years with this relation, he sailed with Admiral Roddam. In 1774, during the American war, he went to Boston with Admiral Graves, and, in 1775, was made a lieutenant by him, on the day of the battle of Bunker's Hill, when Collingwood, with a party of seamen, supplied the British army with what it required. In 1776 he took the command of the Hornet sloop, and soon after met, at Jamaica, with his favourite companion Horatio Nelson, who was then lieutenant of the Lowestoffe. Collingwood says, in one of his interesting letters: 'We had been long before in habits of great friendship, and it happened here, that as Admiral Sir P. Parker, the Commander-in-Chief, was the friend of both, whenever Nelson got a step in rank, I succeeded him: first in the Lowestoffe, then in the Badger, into which ship I was made commander in 1779, and afterwards in

the Hinchinbroke, a 28-gun frigate, which made us both post-captains.'

Although Nelson, who was a younger man, always kept a remove a-head of him, and came in for a much larger share of fame or popularity, Collingwood never had a feeling of jealousy towards his friend, whose merits he was always the first to extol, and whom he loved to the last hour of his life. Nelson, on his part, seems to have had a greater affection for Collingwood than for any other officer in the service.

In 1780 Nelson was sent, in the Hinchinbroke, to the Spanish Main, with orders to pass into the South Sea, by a navigation of boats along the river San Juan, and the lakes Nicaragua and Leon—a physical impossibility which no skill or perseverance could surmount. Nelson caught the disease of the climate, and his life was with difficulty saved by sending him home to England. Collingwood, who succeeded him at the San Juan river, had many attacks: his hardy constitution resisted them all, and he survived the mass of his ship's company, having buried in four months 180 of the 200 men who composed it. Other ships suffered in the same proportion. In August, 1781, Collingwood was wrecked in the middle of a dreadful night in the Pelican, a small frigate which he then commanded, on the rocks of the Morant-keys in the West Indies, and saved his own and his crew's lives with great difficulty. His next appointment was to the Sampson 64. In 1783 he went to the West Indies in the Mediator, and remained with his friend Nelson on that station till the end of 1786. He then returned, after 25 years' uninterrupted service, to Northumberland, 'making,' as he says, 'my acquaintance with my own family, to whom I had hitherto been, as it were, a stranger.' In 1790 he again went to the West Indies, but a quarrel with Spain being amicably arranged he soon returned, and seeing, as he says, no further hope of employment at sea, he 'went into the north and was married.' In 1793 the war with the French Republic called him away from his wife and two infant daughters, whom he most tenderly loved, though he was never after permitted to have much of their society. As captain of the Barfleur he bore a conspicuous part in Lord Howe's victory of the 1st of June, 1794. In 1797 he commanded, with his usual bravery and almost unrivalled nautical skill, the Excellent 74, in Jarvis's victory of the 14th of February, off Cape St. Vincent. In 1799 he was raised to the rank of rear-admiral. The peace of Amiens, for which he had long prayed, restored him to his wife and children for a few months in 1802, but the renewed war called him to sea in the Spring of 1803, and he never more returned to his happy home. This constant service made him frequently lament that he was hardly known to his own children; and the anxieties and wear and tear of it shortened his valuable life. Passing over many less brilliant but still very important services, Collingwood was second in command in the battle of Trafalgar, fought on the 21st of October, 1805. His ship, the Royal Sovereign, was the first to attack and break the enemies' line, and, upon Nelson's death, Collingwood finished the victory and continued in command of the fleet. He was now raised to the peerage. After a long and most wearying blockade of Cadiz, the Straits of Gibraltar and adjacent coasts, during which, for nearly three years, he hardly ever set foot on shore, and showed a degree of patience and conduct never surpassed, he sailed up the Mediterranean, where his position involved him in difficult political transactions, which he generally managed with ability. The letters to foreign princes and ministers, the despatches of this sailor who had been at sea from his childhood, are admirable even in point of style. Completely worn out in body, but with a spirit intent on his duties to the last, Collingwood died at sea on board the Ville de Paris, near Port Mahon, on the evening of the 7th of March, 1810. In command he was firm but mild—most considerate of the comfort and health of his men, averse to flogging and all violent and brutal exercises of authority; the sailors called him their father. As a scientific seaman and naval tactician he had few, if any equals, and in action his judgment was as cool as his courage was warm. His mind was enlightened to an astonishing degree, considering the circumstances of his life; he was liberal and kind-hearted, and all his private virtues were of the most amiable sort. His letters to his wife on the education of his daughters are full of good sense and feeling. (*A Selection from the Public and Private Correspondence of Vice-Admiral Lord Collingwood: interspersed with Memoirs of his Life.* By G. L. Newnham Collingwood, Esq., F.R.S., 2 vols. 8vo., second edit. Lond., 1828.)

COLLINS, JOHN, the son of a nonconformist clergyman, was born at Wood Eaton, in Oxfordshire, March 5, 1624. He was at first apprenticed to a bookseller at Oxford, but went abroad during the civil war, and served the Venetians at sea against the Turks. After the restoration he was made accountant to the excise office, which office was abolished before 1670. From that time he supported himself mostly by his skill in accounts. He died in London, November 10, 1683.

Collins was an early member of the Royal Society, and contributed some fair papers to its transactions. (Numbers 30, 46, 69, 159.) He also wrote several elementary works, which it is not now necessary to mention. His claims to remembrance are the intimate communication in which his attainments placed him with all men of science at home and abroad, from Newton downwards. The influence of his request and recommendation produced (as is asserted) Barrows's Lectures, his Archimedes and Apollonius, Branker's Translation of Rhonius, Kersey's Algebra, and Wallis's History of Algebra. The esteem in which Collins, a poor accountant, was held by men so much above him in external position, as Newton, Barrow, Wallis, &c., is honourable to all parties. The principal result however of their epistolary intercourse is the work on the invention of fluxions, published in 1712, under the title of 'Commercium Epistolicum,' &c., which will be noticed in a separate article. [COMMERCIUM EPISTOLICUM.] (See the *Biogr. Dict.*, which cites Birch; *Hist. Roy. Soc.*; and Wood, *Fasti Oxon.*)

COLLINS, ANTHONY, was born in 1676 at Heston, near Hounslow, in Middlesex. His father, Henry Collins, Esq., was an independent gentleman, with an income of 1800*l.* a year. After the usual preparatory studies at Eton, he went to King's College, Cambridge, and had for his tutor Francis Hare, afterwards bishop of Chichester. He then became a student of the Temple, and married a daughter of Sir Francis Child, lord mayor of London. During 1703 and 1704 he carried on a correspondence with Locke, who appears to have cherished a most enthusiastic friendship for him. Twenty-five letters of Locke to Collins are preserved in the 'Collection of Pieces by Locke, not contained in his works,' published by Des Maizeaux, 8vo., 1720. In one of these, dated October 29, 1703, Locke says to his friend, 'Your complaining of a great many defects is the highest recommendation I could desire to make me love and esteem you, and desire your friendship; and if I were setting out in the world, I should think it my greatest happiness to have such a companion as you, who have a true relish of truth—would in earnest seek it with me—from whom I might receive it undisguised, and to whom I might freely communicate what I thought true. Believe it, my good friend, to love truth for truth's sake is the principal part of human perfection in this world, and the source of all other virtues: and if I mistake not, you have as much of it as ever I met with in any body. What then is there wanting to make you a friend for any one to be proud of?' In one dated Oates, September 11, 1704, he says, 'Your soul is enriched with the most valuable qualities of human nature, truth and friendship: what a treasure have I then in such a friend with whom I can converse, and be enlightened about the highest speculations.' In one dated the 1st of the following October he says, 'My infirmities prevail so fast upon me, that unless you make haste hither I may lose the satisfaction of ever seeing again a man that I value in the first rank of those I leave behind me.' In a remarkable letter, dated August 23, 1704, and addressed 'For Anthony Collins, Esq., to be delivered after my decease,' Locke, after speaking of having left property to Collins, and the guardianship of a young friend, concludes with 'May you live long and happy—I know you loved me living, and will preserve my memory now I am dead. Adieu, I leave my best wishes with you.' In 1707 Collins published an essay concerning human reason as supporting human testimony. It was replied to by Bishop Gastrell. The same year he entered into a controversy with Dr. Samuel Clarke, in support of Dr. Dodwell's book against the natural immortality of the human soul. Five successive rejoinders were elicited. (*General Dict.*, fol., 1736; and *Biog. Brit.*) In 1709 he published 'Priest-

craft in perfection, or a detection of the fraud of inserting and continuing this clause (the church hath power to decree rites and ceremonies, and authority in controversies of faith) in the 20th article.' It passed through three editions in the same year, and occasioned a very general and anxious inquiry. Numerous pamphlets, sermons, and books discussed the question. Two works especially were written against it with great labour, and were supplied with hints and materials from all quarters of the church: one, entitled 'A Vindication of the Church of England from Fraud and Forgery, by a Priest,' 8vo., 1710; the other, a long-delayed and elaborate essay on the Thirty-nine Articles, by Dr. Bennet, 8vo. To these Collins replied in his historical and critical essay on the Thirty-nine Articles, in 1724, proving (p. 277-278) that the clause has neither the authority of the convocation nor of the parliament. Collins's next work was entitled 'A Vindication of the Divine Attributes,' being remarks on a sermon of the archbishop of Dublin, which asserted the consistency of divine foreknowledge and predestination with human free-will. He went in 1711 to Holland, where he formed a friendly intercourse with Le Clerc, and other leading characters among the learned of that country. On returning to England he published, in 1713, his 'Discourse on Freethinking,' which excited much animadversion among the clergy. The most important of the replies which appeared was that by Dr. Bentley, entitled 'Remarks on the Discourse of Freethinking by Phileleutherus Lipsiensis,' which is remarkable as a display of learned sagacity, coarse wit, and the most intemperate abuse. The object of Collins is to show that, in all ages, the most intellectual and virtuous men have been freethinkers; that is, followers of philosophical reasoning, in disregard of established opinions. There are several French editions of this work. It was reprinted at the Hague, with some additions and corrections derived from Bentley's Remarks. On the continent it was answered by Crousaz, and several others. The 'Clergyman's Thanks to Phileleutherus,' 1713, is by Bishop Hare. Collins, on returning from a second residence in Holland, was made justice of the peace and deputy-lieutenant of the county of Essex, offices which he had previously held in Middlesex. In 1715 he published his 'Philosophical Inquiry concerning Liberty and Necessity,' which was reprinted in 1717 in 8vo., with corrections. It was translated into French, and is printed in the 'Recueil de Pièces sur la Philosophie,' &c., by Des Maizeaux, 2 vols. 12mo., 1720. Dr. Samuel Clarke replied to the necessarian doctrine of Collins, chiefly by insisting on its inexpediency, considered as destructive of moral responsibility.

In 1718 Collins was appointed treasurer of the county of Essex, an office which he performed with great fidelity. He married, in 1724, his second wife, the daughter of Sir Walter Wrottesley, Bart. In the same year he published his 'Grounds and Reasons of the Christian Religion,' in which his object is to show that Christianity is founded and dependent on Judaism; that the New Testament is based upon the Old, as the canon of Christians; that the apostles and writers of the former establish and prove their propositions from the latter; and that none of the passages they adduce are literally, but merely typically, and allegorically applicable, by the assumption of a double construction. This work created a great sensation in the church, and drew forth a great number of replies from some of the most eminent divines. In the final answer of Collins, 'Scheme of Literal Prophecy,' 1726, he enumerates five-and-thirty replies which appeared during the two first years after its publication. The artful way in which Collins availed himself of the theory of Whiston respecting the corruption of the present Hebrew text, so provoked that divine, that he petitioned Lord Chancellor King, though without success, to remove Mr. Collins from the commission of the peace. In 1727 Collins, in a long letter, replied to eight sermons of Dr. Rogers on the necessity of revelation and the truth of Christianity. He died in December, 1729, at his house in Harley Square, London, in consequence of being long afflicted with the stone. In his last moments he said, 'I have always endeavoured, to the best of my ability, to serve my God, my king, and my country, and I am certain I am going to that place which God has designed for those who love him, for the Catholic religion is to love God and to love man.' He was interred in Oxford Chapel, London. The long and elegant Latin epitaph on his monument there, is inserted in the 'General Dict.' and in the 'Biog. Brit.' All parties agree that the moral and social character of Collins was remarkably amiable. Temperance and benevolence were its prominent points. His integrity, energy, and impartiality in the exercise of his magisterial functions commanded the highest respect, and by all his conduct and writings he ardently endeavoured to promote the cause of civil and religious liberty. Collins, as a writer, is remarkable for the great shrewdness of his reasoning; and for still greater subtility in masking the real drift of his arguments with orthodox professions. His library, which was of great extent and extremely curious, was open to all men of letters, to whom he readily communicated whatever he knew, and even furnished his antagonists with books and arguments to refute his own writings. A catalogue of his books was published by the Rev. Dr. Sykes in 1730. (*General Dictionary*, *Biog. Brit.*; Hollis's *Memoirs*.)

COLLINS, WILLIAM, the son of a hatter at Chichester, was born December 25, 1720. He was educated at Winchester, from which he went to Queen's College, Oxford; but in about half a year he removed to Magdalen, on being elected a *demy*, or scholar, of that body. Soon after taking his bachelor's degree he quitted the university abruptly, about 1744, and repaired to London as a literary adventurer. He won the cordial regard of Johnson, then a needy labourer in the same vocation, who, in his 'Lives of the Poets,' has spoken of him with tenderness. He tells us that 'his appearance was decent and manly, his knowledge considerable, his views extensive, his conversation elegant, and his disposition cheerful. He designed many works, but his great fault was irresolution; or the frequent calls of immediate necessity broke his scheme, and suffered him to pursue no settled purpose.'

His Odes were published, on his own account, in 1746. They were not popular; and it is said that, disappointed at the slowness of the sale, he burnt the remaining copies with his own hands. He was relieved from his embarrassments by a legacy from an uncle of 2000*l.*; but worse evils than poverty overclouded the rest of his life: he sank gradually into a species of melancholy and intellectual languor, to relieve which, he resorted to intoxication. 'Those clouds which he perceived gathering on his intellect he endeavoured to disperse by travel, and passed into France; but found himself constrained to yield to his malady, and returned. He was for some time confined in a house of lunatics, and afterwards retired to the care of his sister at Chichester, where death, in 1756, came to his relief.' (*Lives of Poets.*)

Collins is inferior to no English lyric poet of the eighteenth century, except Gray. His Odes to 'Fear,' and the 'Passions,' afford the best specimens of his genius; and the well-known 'Dirge in Cymbeline' is admirable in a softer style. His poetical merits Dr. Johnson did not rightly appreciate. Mrs. Barbauld, in her edition of his works, has given a more favourable and juster character of them. 'He will be acknowledged to possess imagination, sweetness, bold and figurative language. His numbers dwell upon the ear, and easily fix themselves in the memory. His vein of sentiment is by turns tender and lofty, always tinged with a degree of melancholy, but not possessing any claim to originality. His originality consists in his manner, in the highly figurative garb in which he clothes abstract ideas, in the felicity of his expressions, and his skill in embodying ideal creations. As it was, he did not enjoy much of the public favour; but posterity has done him justice, and assigned him an honourable rank among those of our poets who are more distinguished by excellence than by bulk.

COLLISION (con, lædo.) The striking against each other of two bodies in motion. The mathematical laws of collision are usually treated under the word IMPACT in English treatises, and under the head *choc des corps* in French.

COLLURICINCLA. [LANIADÆ.]

COLLU'RIO. [LANIADÆ.]

COLMAN, GEORGE, commonly called 'the Elder,' was the son of Francis Colman, Esq., British resident at the court of the Grand Duke of Tuscany, by a sister of Anna-Maria Pulteney, Countess of Bath. He was born at Florence about 1733, and was educated at Westminster. He afterwards became a student of Christ Church, Oxford, and forming an acquaintance with Mr. Bonnel Thornton, published in conjunction with that gentleman, the perio

dical paper called 'The Connoisseur.' Fixing on the law for a profession, he was entered at Lincoln's Inn, and duly called to the bar. In 1760 he produced his first dramatic piece, entitled 'Polly Honeycomb,' at Drury Lane with great success. This was followed in 1761 by the comedy of 'The Jealous Wife,' and in 1766 by that of 'The Clandestine Marriage,' written in conjunction with Mr. Garrick. In 1767 he united with Messrs. Harris, Rutherford, and Powell, in the purchase of Covent Garden Theatre, and became the acting manager, in which situation he continued seven years, when he sold his share to Mr. Leake. In 1777 he purchased the little theatre in the Haymarket of Mr. Foote. In 1785 Mr. Colman was seized with the palsy, and four years afterwards discovered symptoms of an alienation of mind, which gradually increasing terminated in a state of idiotism. He died at Paddington on the 14th of August, 1794, aged sixty-two. Mr. Colman, besides writing and adapting upwards of thirty dramatic pieces, was the author of a very spirited translation in blank verse of Terence, a translation of and commentary on Horace's Art of Poetry, and several fugitive pieces.

COLMAN, GEORGE, 'the Younger,' son of the preceding, was born October 21, 1762. His education was commenced at Mr. Fountain's academy in Marylebone, from whence he was removed to Westminster, and afterwards entered at Christ Church, Oxford. From thence he was sent by his father to King's College, Old Aberdeen, and on his return to London was entered of the Temple; but following the peculiar bent of his genius and the example of his father, he soon commenced writing for the stage. During the illness of Mr. Colman, Sen., he directed the Haymarket Theatre, and on the death of his father King George III. kindly transferred the patent to him. He married first Miss Morris, the sister of the present proprietor of the Haymarket, to whom he sold his interest in the theatre; and secondly, the popular actress Mrs. Gibbs. Mr. Colman, Jun., was appointed by George IV. Exon of the Yeoman Guard (an office which he afterwards by permission disposed of), and by his Grace the Duke of Montrose, then Lord Chamberlain, Examiner of Plays, which situation he held to the day of his death, Wednesday, October 26, 1836, having just completed his seventy-fourth year. Mr. Colman was the author of several excellent plays and farces: amongst the most popular are 'John Bull' (for which comedy he received the largest sum of money perhaps ever paid for any drama), 'The Poor Gentleman,' 'Heir at Law,' 'Inkle and Yarico,' 'Iron Chest,' 'Mountaineers,' 'Surrender of Calais,' 'Ways and Means,' 'Review,' 'Blue Beard,' 'X. Y. Z.,' and 'Love Laughs at Locksmiths.' He also wrote the well-known comic tales entitled 'Broad Grins,' 'Poetical Vagaries,' &c., and a variety of smaller poems. His last literary work was the publication of his own memoirs up to the time of his entering on the management of the Haymarket, in 2 vols., 8vo.

COLMAR, a town in France, capital of the department of Haut Rhin; on the left or west bank of the river Lauch, just above its junction with the Ill, and also on a branch or canal of the Fecht, another tributary of the Ill; 234 miles from Paris, in a direct line E. by S. or E.S.E., or 290 miles by the road through Châlons, Bar-le-duc, Nancy, &c. In 48° 5′ N. lat. and 7° 20′ E. long.

It has been thought by some antiquaries that Colmar was built of the ruins of the antient Argentuaria, or Argentovaria (Ἀργεντουάρια, Ptolemy), near to which the Emperor Gratian defeated the Allemanni A.D. 378; but the position of Argentovaria was probably nearer the Rhine, between Markolsheim and Artzenheim. (D'Anville.) This town was much favoured by the Emperor Frederick II., who enlarged it. It was one of the imperial cities, and disputed with Ensisheim the precedency among the towns of the Upper Alsace. Having been ceded to France by the treaty of Munster in 1648, the king of France ordered the fortifications to be razed (A.D. 1673): Colmar is consequently an open town. Under the old government of France the inhabitants, though deprived of their antient municipal constitution, enjoyed several privileges; and the Reformed, who constitute half the population, had, as well as the Catholics, the free exercise of their religion. Colmar was formerly included in the diocese of Porentru.

The town is beautifully situated in a plain near the foot of the Vosges. It is a handsome place; the streets are watered by small streams from the Lauch and the canal of the Fecht. The church of the Dominicans is the handsomest of its antient buildings. The prisons and the theatre are also worthy of notice. The inhabitants amounted, in 1832 to 15,131 for the town, or 15,442 for the whole commune They manufacture printed calicoes, tapes and ribands; there is a powder-mill near the city. Considerable trade is carried on in the agricultural produce of the district, wheat and other grain, and wine of good quality. The town is the seat of a *Cour Royale*, or supreme court of justice There is a college or high school, a société d'émulation, and a public library, one of the richest in France, containing above 60,000 volumes. The revenue of the town is considerable. Among the natives of Colmar may be mentioned Martin Schoen, the earliest engraver in metal, and Rewbel, one of the members of the Executive Directory of France.

The arrondissement of Colmar contained, in 1832, 189,589 inhabitants: it occupies the northern part of the department. It is the seat of an extensive cotton manufacture. The mountain streams which traverse it supply a moving power for machinery.

COLNBROOK. [BUCKINGHAMSHIRE.]

COLNE. [THAMES.]

CO'LOBUS (Zoology), a genus of Quadrumanous mammifers (Cheiropeds of Mr. Ogilby); established by Illiger and adopted by M. Geoffroy. The latter places the genus in the group of *Singes catarrhins*, or monkeys of the old continent; a group distinguished by having their nostrils separated by a very thin partition, and by possessing five molar teeth only on each side of the two jaws.

Generic character.—Facial angle from 40 to 45 degrees; muzzle short; face naked; body elongated and small; extremities slender; the anterior hands deprived of a thumb; the fingers rather short; the posterior thumb very distant from the fingers, and placed very much backwards; tail longer than the body, small, and tufted at the end; cheek-pouches and callosities on the buttocks.

The Colobi, which are supposed to be inhabitants of the Coast of Guinea, seem to be in the old world the representatives of Ateles, whose locality is South America. Example:—*Colobus polycomos*, Geoffroy.

This species, which is the *Simia polycomos* of Schreber, the *Simia comosa* of Shaw, the *Guenon à camail* of Buffon, and the *Full Bottom* of Pennant, is very handsome. The head and upper part of the body are covered with hair,



[Colobus polycomos.]

falling over the shoulders and forming a kind of hood and pelerine, from whence it derives the name given to it by Buffon, while the resemblance of this *chevelure* to a wig determined Pennant to give it the English name above recorded. This ornament is composed of floating hairs, which are yellow mingled with black; the face is brown, and the rest of the body is covered with very short close hair of a jet-black, a colour which sets off the snow-white tail, which is much longer than the body and not prehensile. In this last particular, in the possession of cheek-pouches, and in other characters, it differs from Ateles, while in some points, and especially in the absence of the thumb in the anterior hands, it resembles it much.

Locality, the forests of Sierra Leone, where the natives give it the name of 'the King of the Monkeys' (*Roi des Singes*), apparently, says Desmarest, on account of the beauty of its colours, and its 'camail,' which represents a sort of diadem. They attach great value to its fur, of which they make ornaments, and apply it to various purposes.

Besides M. Geoffroy's other species, *Colobus ferruginosus*, *Simia ferruginea* of Shaw, *Autre Guenon* of Buffon, the Bay Monkey of Pennant, which is by many considered to be only a variety of *Colobus polycomos*, the French zoologists mention another species, *Colobus Temminckii*, Kuhl, which is described by them as extremely scarce, and its locality unknown. The specimen belonging to M. Temminck came from Bullock's Museum, and together with many other rarities was suffered to leave this country when that fine collection was broken up, to the great regret of all English zoologists, and to the manifest advantage of foreign establishments.

Such was the history of this curious genus; when in June, 1832, several imperfect skins of mammalia, recently obtained by Mr. Gould from Algoa Bay, were exhibited to the Zoological Society of London. One of these skins, that of a *monkey*, deficient as to the head and hands, was, Mr. Bennett remarked, evidently referrible to the *Colobus polycomos* of Illiger; the long milk-white tail strongly contrasting with the bright deep-black fur of the body, being fully sufficient to characterize it. On the upper part of the skin, above the shoulders, some nearly white hairs were intermingled with the black ones. The only discrepancy observable between the specimen and the description of the species given by Pennant was in the great length of the hairs of the body, the greater number of them being four or five inches long: this, it was stated, might be dependent on age or locality. Another skin, equally imperfect with the preceding, was declared to be that of the *Colobus ferrugineus* of Illiger, with the state of which, described by Mr. Kuhl under the name of *Colobus Temminckii*, the specimen agreed in every respect, except in the absence of any yellow tinge in the rufous fur covering the under surface of the body.

In July, 1835, Mr Ogilby exhibited to the same Society several rare and undescribed species of mammalia and birds, brought from the Gambia by Mr. Rendall. Among them were materials which, together with the specimens then lately brought from Abyssinia by Dr. Rüppell, gave Mr. Ogilby an opportunity of revising the natural history of the genus Colobus, six species of which he then recorded.

1. *Colobus polycomos*, Schreber, with the head and shoulders covered with long, coarse, flowing hair, of a dirty yellowish colour, mixed with black; body, arms, and legs of a fine glossy blackness, covered with short hair; tail of a snowy whiteness, with very long hair at the end, forming a tuft. (Pennant.) Locality, Sierra Leone.

2. *Colobus Ursinus*, Ogilby, 'with very long glossy black hair over the whole body and extremities, and a long snowy-white tail, tufted at the end;' described from two imperfect skins, without heads or hands, the same as those noticed by Mr. Bennett and above referred to. These skins, Mr. Ogilby remarks, were considered by Mr. Bennett as referrible to the *Colobus polycomos;* and the general colour of the body and tail, as well as a slight appearance of grizzled or gray hair about the neck, where the head had been cut off, would, at first sight, Mr. Ogilby allows, appear to justify Mr. Bennett's views; but the words of Pennant (the only original describer of the species) imply that the 'long dirty yellowish hair,' which he compares to a full-bottomed periwig, grows from the shoulders and neck, as well as the head, and expressly declare that the hair on the rest of the body, as well as on the legs, is short. Now, in the specimens at present under consideration, the very reverse of this is observable. The black hair of the shoulders, as already observed, has a partial mixture of silvery-white on the anterior face, just where the head has been cut off; but it is not longer than the hair upon the rest of the body and limbs, which is moreover five or six inches in length, and in texture and appearance not unlike that of the *Ursus labiatus*. The whole animal, in fact, resembles a small *bear*, and is covered with the same, uniform, long, black, and glossy fur upon every part except the tail, which, at the root more particularly, is furnished with much shorter hair. Whether or not this species, like the *polycomos*, has the head of a different colour from the body, is a subject for further observation: the white or silvery hairs already mentioned as still remaining about the shoulders render it extremely probable that it has, but in no case can it form the striking contrast in length, nor present the long flowing mane or wig-like appearance ascribed to the animal observed by Pennant. Mr. Gould, who procured these skins for the Society, reported them as coming from Algoa Bay: we know enough of the zoology of that part of Africa to render this account extremely doubtful, and the probability is, either that Mr. Gould was misinformed, or that he may have mistaken Dalagoa Bay for Algoa, which, from the similarity of sound, might readily happen. If this conjecture should prove correct, it would follow that the *Colobus ursinus* was the analogue of the *Colobus polycomos*, on the opposite coast, and the conjecture receives further countenance from the fact of many other known species of mammals having such analogues in the same localities.

3. *Colobus Guereza*, Rüppell, with the head, face, neck,



[Colobus Guereza.]*

* From the specimen in the British Museum, where we have always found the greatest facilities. We are glad to observe that the collection of Mammalia has lately been increased nearly one-third.

back, limbs, and basal half of the tail, covered with short black hair; the temples, chin, throat, and a band over the eyes, white; the sides, flanks from the shoulders downwards, loins and buttocks, clothed with long flowing white, which hangs down on each side like a loose garment; the tip of the tail tufted with dirty-white. Locality, Abyssinia. There is a specimen, one of Dr. Rüppell's, in the British Museum.

4. *Colobus ferruginosus*, Geoffroy. Crown black; back of a deep bay colour; outside of the limbs black; cheeks, under part of the body, and legs, very bright bay; tail black. (Pennant's description.) Locality, Sierra Leone.

5. *Colobus fuliginosus*. Smoky-blue above, dirty yellowish-gray beneath; cheeks, throat, tail, and extremities, brick-red. (Ogilby.) Locality, the Gambia. Mr. Ogilby observes that the face is short, the head round, and the whole form and habit of the animal similar to those of the *Semnopitheci*. The teeth, he adds, are of the usual form and number, and *there are large and very distinct cheek-pouches*. 'I was the more particular,' says Mr. Ogilby, 'in making this last observation, because the organs in question had not been previously recorded as existing in the *Colobi*, and because M. Geoffroy St. Hilaire, in his valuable lectures, of which it is a matter of great regret that so small a portion has been given to the public, even doubts their existence.'

6. *Colobus Temminckii*, Kuhl, 'with the hands, face, and tail, purplish-red; rest of the members clear-red; belly reddish-yellow; head, neck, back, shoulders, and outer face of the thighs, black.' Habitation unknown: described from a specimen formerly in Bullock's Museum, and now in that of Leyden. Notwithstanding some slight discrepancies, Mr. Ogilby agrees with Mr. Bennett in referring to this species the two other skins of the Society's collection noticed by the latter and above alluded to. These skins, he observes, were procured at the same time, and most probably in the same locality, as those of *Colobus ursinus*, and are equally imperfect; and he further remarks, that if the conjecture already thrown out with regard to the derivation of these skins should turn out to be well founded, and if the animal described in his paper eventually proves to be identical in species with *Colobus Temminckii*, which he sees no just reason to doubt, it follows that the hitherto unascertained habitation of that species must be sought on the east coast of Africa. Mr. Ogilby adds, that Fischer, probably induced thereto by the authority of M. Temminck, has united the *Colobus Temminckii* with the *Colobus ferruginosus* or *Bay Monkey* of Pennant, but that there is no doubt as to the specific distinction of the two animals.

COLOCA'SIA, a kind of arum, the leaves and tubers of which, notwithstanding their acridity, are used as food by the natives of the south of Europe. It is cultivated in Portugal, Greece, and Egypt, and is supposed to have been the *Colocasium* of Virgil, the *Aron kurenäikon* of Galen, and the *Niliacum olus* of Martial.

COLOCYNTH. [CUCUMIS.]

COLOCZA (Kalocsa, Kalotscha), in the Hungarian circle of Pesth, is in a swampy plain, on a small arm of the left bank of the Danube, in 46° 32′ N. lat., and 19° 0′ E. long. It was known in the time of the Romans. It is the seat of an archbishop, and contains 1356 houses and about 6000 inhabitants. The most striking buildings are the palace of the archbishopric, which resembles a fortress, and has a library of 30,000 volumes, and the cathedral church of the Annunciation. To the archbishopric of Colocza is united the bishopric of Bacs, the metropolitan chapter of which has its seat also here. The town has an archiepiscopal lyceum, with a theological seminary; a Piarist college, which in 1825 contained 141 scholars; a gymnasium, and a Roman Catholic grammar school. The library contains the celebrated MS. called the 'Colocza Codex of Old German Poems,' supposed to have been written in the latter part of the fifteenth century. This valuable work is written and illuminated on beautiful parchment; contains 336 pages, comprises 15 poems, consisting of 54,000 verses, and is 4 inches thick, 11 high, and nearly 10 wide. The inhabitants are chiefly engaged in the breeding of horses and cattle, and in fishery.

COLOGNE, a government circle (Regierungs-Bezirk) of Rhenish Prussia, in the province of Juliers—Cleves-Berg, lies on the banks of the Rhine, which traverses it for twenty-eight miles from north to south, and divides it into the eastern and western portions. The southern, western, and eastern portions are mountainous, especially near Bonn; the northern is level, and contains but few elevations. Besides the Rhine, Cologne is watered by the Muhlenbach, Sieg, Strundesbach, Wipper, &c. The greatest length of the circle from east to west is about forty-six miles. It is bounded on the north by the circle of Düsseldorf, on the east by Arnsberg, on the south by Coblenz, and on the west by Aix-la-Chapelle, and occupies an area of about 1566 square miles. Of this surface about 517,000 acres are arable land, 31,800 gardens, 3000 vineyards, 77,000 meadows and pastures, 277,000 forest, 64,000 waste land, and 32,000 are occupied by roads and rivers. The circle is divided into 11 minor circles; viz., Bergheim, Bonn, Cologne, Enskirchen, Gummersbach, Mühlheim, Rheinbach, Sieg, Waldbroel, and Wipperfürth. It contains 17 towns, 4 market towns, 465 villages, 156 Roman Catholic churches and 119 churches of ease, 40 Protestant and 5 churches of ease, 3 free churches, 211 Roman Catholic chapels, and 34 synagogues. The population in 1816, including the military, was 332,818; in the year 1828, 383,585, of whom 326,826 were Roman Catholics; 52,096 Protestants; and 4069 Jews; and in 1831, 386,938. It contains one university, that of Bonn, and four gymnasia. The stock consisted, in 1819, of 13,854 horses, 137,758 horned cattle, 61,568 sheep, and 11,716 goats; in 1831, of 15,610, 129,622, 62,221, and 10,465 respectively. The principal employments are the working of coal, lead, and iron mines, the potteries, and the manufacture of woollens, linen, leather, Cologne water, potash, sugar, and tobacco; besides dyeing, cotton printing, and tanning.

COLOGNE (Cöln), the capital of the circle, in 50° 55′ N. lat., and 6° 53′ E. long., extends in a crescent-shape along the left bank of the Rhine. It is enclosed by a lofty wall about 6 miles in circuit, defended by eighty-three towers, and surrounded with ramparts and deep ditches. It has twenty-four gates on the land and water-sides; and in front of the seven principal gates strong redoubts have been erected. Cologne owes its origin to the Romans. It was a Roman station, and subsequently a colonia, under the name of Colonia Claudia Agrippinensis, so called from the Emperor Claudius and his wife Agrippina, who was born here while her father Germanicus commanded in these parts. Agrippina adorned it with an amphitheatre, temples, aqueducts, &c., the ruins of which may still be traced. It continued to be the capital of Lower Rhenish Gaul till 330, and after a frequent change of masters was annexed to the German empire in 870. It took part in some of the many disputes which arose in the empire, and was besieged by Henry V. for its attachment to his father Henry IV.; and afterwards unsuccessfully by Philip of Swabia, for having proclaimed his rival Otto IV. In 1349, the principal Jews of Cologne, anticipating the same fearful persecutions as in other places, shut themselves up with their wives and children, and set fire to their houses; upon this, the surviving Jews were compelled to leave the city, and though they subsequently obtained permission to return, they were again obliged to quit it in 1429

Cologne was one of the most powerful and wealthy cities of the Hanseatic league. At that time it could muster an armed force of 30,000 men, and its population amounted to 150,000 souls. When the Hanseatic league engaged in a war with England in 1452, Cologne sided with England, on which account it was formally excluded from the league; but on the conclusion of peace by the treaty of Utrecht in 1474, it was re-admitted to this privilege upon the intercession of the Emperor Frederic III. During the whole of this period the commerce of Cologne was extremely flourishing. In the eleventh century the Colognese vessels carried Rhenish wines, corn, flour, malt, beer, linen, and other German produce to all countries lying on the German Ocean and the Baltic, to England, France, Spain, Portugal, Italy, Norway, Sweden, and Russia, and brought back the productions of those countries.

The trade of Cologne with England at this early period was very considerable, and King John conceded to the merchants of Cologne privileges rarely granted to his own subjects. Whitehall was the property of the city of Cologne, and allotted exclusively to the Rhenish trade. Cologne had a large factory in Norway and the Netherlands; and all vessels navigating the Rhine were obliged to unlade their cargoes at Cologne, whence they were conveyed in its own ships. The arts and sciences were equally flourishing; its university was one of

the most famous in Germany. The specimens of its architecture, paintings on glass, sculptures, and pictures, which still exist, attest the perfection which its artists had attained. Intestine divisions, the expulsion of the Jews, the public destruction of its looms, which compelled their owners to emigrate, and various other causes, hastened its decline. It ceased to be a free town in 1792.

Cologne is divided into four sections, and is built in a very irregular manner; the streets, many of which still retain their Roman names, are narrow, dark and crooked, and paved with basalt. It contains twenty-five churches, eight chapels, a synagogue, and many public buildings, the most remarkable of which is the cathedral, which, if completed, would be the most magnificent monument of Gothic architecture in Europe. It was designed by Archbishop Engleberg of Berg, and was begun in 1284 by Archbishop Conrad of Hochstedten, called the Solomon of his age; it is in the form of a cross, 400 feet in length, and 180 in breadth; the roof rests on 100 columns, of which the four centre ones are 30 feet in circumference. The only part however which is finished is the splendid choir, with its surrounding chapels and its superb painted glass windows. Of the two towers, which were intended to be 500 feet in height, one is raised only half this elevation, and the other not more than 21 feet. Considerable progress is now making in completing various parts of the cathedral, under the direction of the Prussian government. It contains the tombs of Conrad, Mary de Medicis, &c., and abounds in relics and curiosities, especially the tomb of the Magi, which is richly adorned with gold and precious stones. Among the other interesting churches are those of St. Ursula, celebrated from the legend of the martyrdom of herself and 11,000 virgins, the churches of St. Columba, the Annunciation, St. Gereon, and St. Peter, which last contains a chef-d'œuvre of Rubens, representing the martyrdom of that apostle. The other buildings of note are the antient Carthusian convent, the town-hall, the hotel of Gurzenut, where the diet and festive meetings were formerly held, the hall of justice, the archiepiscopal palace, &c. Between Cologne and Deutz is a bridge built in 1822, which rests on 39 pontoons, and is 1250 paces long.

Cologne is the centre of the provincial administration, the residence of the archbishop, and the seat of various public boards. It contains two gymnasia; one Roman Catholic, which in 1827 had 484 scholars, and the other Protestant, with about 290 scholars: the latter has a valuable library of 33,000 volumes, an observatory, and a botanical garden. There is also the library of the town-hall, of the archbishop, which contains 10,000 volumes, a public archive, with valuable documents, collections of Roman antiquities, MSS., coins, natural history, &c. Besides several elementary schools for Protestants and Roman Catholics, the town has a grammar-school, a school of trades, three of commerce, a seminary for educating schoolmasters, an orphan asylum, hospital, mad-house, &c.

The population in 1827 was 57,022, of whom 54,000 were Roman Catholics, and 2385 Protestants; at present it exceeds 60,000. The chief resources of the inhabitants, besides agriculture and the cultivation of the vineyards, are manufactures, especially of cotton yarns, cotton goods, hosiery, woollens, silks, velvets, tobacco, brandy and spirits, Cologne water, &c. Being the central mart of the Rhenish trade between the Netherlands, Germany, Alsace, and Switzerland, many of the inhabitants are engaged in shipping, and Cologne being a free port, a considerable traffic is carried on in corn, wine, rape-seed, rape-seed oil, coals, &c. In the vicinity of the city are several coal-mines, and abundance of a particularly fine sort of porcelain-earth and potter's clay.

COLOMBIA is the name which was adopted by the northern countries of South America in 1819, when New Granada and Venezuela united and established one central government for the purpose of resisting the Spanish government. In 1829 Venezuela renounced the union, and constituted itself a separate republic. After the resignation of Bolivar in 1830, it again joined New Granada; but this union lasted only a short time. In November, 1831, a new separation took place, and at the same time it was decided that the former province of Quito should constitute a separate republic under the name of Ecuador. Thus Colombia was divided into the three republics of Venezuela, New Granada, and Ecuador.

COLON. The alimentary canal below the stomach is divided into the small and great intestines. The former consist of the duodenum, jejunum, and ileum; the latter of the colon and rectum. The *colon* commences a little above the right groin, in the right iliac fossa [ABDOMEN], in the form of a dilated pouch, which is called the *caput coli*, or more commonly the *cæcum*, from its blind rounded extremity. The ileum opens obliquely into the left side of this pouch, its inner or mucous membrane projecting so as to form the *ileo-cæcal valve*, which, permitting the contents of the small intestine to pass into the colon, suffices to prevent their return, except in peculiar cases of diseased action. Near the same part of the cæcum opens also a slender contorted intestine about two inches long, likewise blind, which is called the *appendix vermiformis*, from its resemblance in the human subject to a worm. The use of this appendage is unknown: in some animals, as the sheep, it is much larger, and is probably of more importance than in man. From the right iliac region the colon passes upwards along the side to the under surface of the liver. Hence it turns to the left, stretching over the upper part of the belly just below and in front of the stomach, to which it is connected by the common attachment of both organs to the *omentum*, a loose pendulous membrane, formed by a double fold of the peritoneum, and spread like an apron in front of the small intestines. Having reached the opposite side of the abdomen, the colon passes downwards to the left iliac fossa; thence, taking two sudden turns to the right and downwards, it descends into the pelvis over the last lumbar vertebra, and becomes continuous with the rectum. The double turn just mentioned is the *sigmoid flexure*; the transverse part is called the *arch* of the colon; and the ascending and descending or lateral parts, as they lie immediately over the loins, are called the right and left *lumbar* portions. The central space thus nearly encircled by the colon is occupied by the convoluted heap of small intestines. The length of the whole canal is six or seven times that of the body in man, the colon constituting about a fifth part. In graminivorous animals its length is proportionably greater; in those which feed exclusively on flesh it is less.

The colon is enveloped in the serous membrane called the peritoneum, which forms the external covering of all the abdominal viscera. [ABDOMEN.] This outer tunic passing entirely round it, meets behind, and forms a duplicature called the *mesocolon*, which attaches it, more loosely at the arch than at the sides, to the spine and loins, and serves as a medium for the passage of nerves and vessels, and the lodgment of absorbent glands. Between the peritoneal coat and the interior mucous lining, there is a layer of muscular fibres, some of which encircle the bowel in scattered bands, and serve to diminish its calibre; others, more regularly arranged in three distinct longitudinal bands, contract its length; and their combined actions, taking place successively in different parts of the intestine, but on the whole propagated from above downwards, agitate its contents backwards and forwards, and urge them ultimately into the rectum.

The colon is amply supplied with blood-vessels, nerves, lymphatics, and ducts, which pour out the mucus that lubricates the interior as well as various excrementitious matters here separated from the blood as being injurious or useless. The canal is not smooth and uniform, like the small intestines, but bulges out between the bands of muscular fibre into various prominences more or less regular in their form, in which the fæces lodge for a time and become deprived of much of their moisture as they are rolled onwards by the peristaltic action. Hence arises their lobulated or globular form, more observable in some of the lower animals, as the horse and sheep, than in man. It is in the colon that the fæces acquire their peculiar odour, which is not perceived above the ileo-cæcal valve. It is in this part of the alimentary canal that the fluid part of the food is chiefly absorbed, being no longer needed to keep the nutritive particles in suspension. The lymphatic vessels of the colon are consequently found distended with a transparent fluid, and not the milk-like chyle absorbed by those of the small intestines. [LACTEALS, LYMPHATICS.] For further information on the functions of the colon, the reader is referred to the account of those of the alimentary canal in general, given under the head of DIGESTION.

The colon is alone or conjointly the seat of many disorders, such as cholera, colic, constipation, diarrhœa, dysentery, enteritis, ileus, introsception, obstruction; and is liable

to ulceration in the course of hectic and other fevers, as well as from local causes. It is occasionally the seat of stricture; and is not unfrequently protruded in the various forms of intestinal rupture.

COLONEL, the commander of a regiment or battalion of troops; he is the highest in rank of those called field-officers, and is immediately subordinate to a general of division.

The derivation of the word is uncertain. It is supposed to have been given originally to the leader of a body of men appointed to found a colony; or to have come from the word *coronarius*, indicating the ceremony of investing an officer with the command of a corps; or, finally, from the word *columna*, denoting the strength or support of an army.

The title of colonel-general was, for the first time, conferred by Francis I., about the year 1545, on officers commanding considerable divisions of French troops, though, according to Brantome, it had been given to the chief of an Albanian corps in the service of France at an earlier period. When the troops of that country were formed into regiments (the infantry about 1565, and the cavalry seventy years afterwards), the chiefs of those corps were designated *Mestres de Camp;* and it was not till 1661, when Louis XIV. suppressed the office of colonel-general of infantry, that the commanders of regiments had the title of colonel.

In England, the constitution of the army was formed chiefly on the model of the French military force; and the terms regiment and colonel-general were introduced into this country during the reign of Elizabeth. It must, moreover, be observed, that in the regulations made by the citizens of London for forming the militia in 1585, it is proposed to appoint *colonels* having authority over ten captains; and that both colonels and lieutenant-colonels are distinctly mentioned in the account of the army which was raised in order to oppose the threatened invasion of the country in 1588. Before the time of that queen, it appears that the commanders of bodies of troops equivalent to regiments had only the general title of captain.

The duties of colonels are described in Ward's 'Animadversions of Warre,' which was published in 1639; and from the account there given, it appears that those duties were then nearly the same as they are at present. To the colonel of a regiment, besides the general superintendence of the military duties performed by the troops composing it, is intrusted the care of providing the clothing of the men and of appointing the agent through whom their pay is transmitted. Colonels take precedence of one another according to the dates of their commissions, and not according to the seniority of their regiments.

The lieutenant-colonel is immediately under the full colonel. He assists the latter in directing the evolutions of the battalion or regiment, which he also commands during the absence of his superior officer.

The annual pay of a colonel is, in the Life Guards, 1800*l.*; in the Grenadier Guards, 1200*l.*; in the Coldstream and Scots Fusilier Guards, 1000*l.*; in the cavalry regiments generally 900*l.*; and in the regular infantry, 500*l.* The daily pay of a lieutenant-colonel is, in the Life Guards, 1*l.* 9*s.* 2*d.*; in the Foot Guards, 1*l.* 6*s.* 9*d.*; and in the infantry, 17*s.* The price of a lieutenant-colonel's commission is, in the Foot Guards, 9000*l.*; in the Life and Horse Guards, 7250*l.*; in the Dragoons, 6175*l.*; and in the infantry of the line, 4500*l.*

COLONIZATION SOCIETY, AMERICAN. [SLAVERY.]

COLONNA is the name of one of the oldest and most illustrious families of Italy. About 1050 it became possessed of the feudal estate of La Colonna on the Tusculan mount. Pietro, lord of Colonna, who lived in the twelfth century, is one of the earliest of the family recorded in history. His son Giovanni was made cardinal by Honorius III., in 1216. The family afterwards divided into several branches, one of which became princes of Palestrina; another dukes of Zagarolo; while others were made dukes of Traietto and counts of Fondi, dukes of Paliano and Tagliacozzo, and princes of Sonnino and Stigliano, in the kingdom of Naples. Moreri, art. 'Colonna,' gives their respective genealogies. At one time they were possessed of a great portion of the Campagna of Roma, besides large estates in Abruzzo. The Colonna were of the Guibeline party: their rivalry with the Orsini and other Roman barons, and their quarrels with several popes, especially with Boniface VIII., are recorded in the history of the middle ages. In the early part of the fifteenth century, one of the Colonna family was made pope under the name of Martin V. A century later, two cousins of the same family, Fabrizio and Prospero Colonna, distinguished themselves in the service of Ferdinand of Aragon, and afterwards of Charles V., against the French in Italy. Several of the same family attained high honours in the kingdom of Naples and in Spain, and others are numbered among the cardinals of the Roman church. Some branches of the family have become extinct, but the Stigliano of Naples and the Sciarra Colonna at Rome continue to exist. The Colonna have an extensive palace with gardens on the slope of the Quirinal at Rome.

COLO'NNA, VITTO'RIA, born in 1490, was the daughter of Fabrizio Colonna, Great Constable of the kingdom of Naples, and of Anna, the daughter of Frederico di Montefeltro, duke of Urbino. At the age of seventeen she married Francis Davalos, son of the marquis of Pescara, who soon after came to the title at the death of his father. Pescara served with distinction in the armies of Charles V., and contributed greatly to the gaining of the battle of Pavia, in which he was wounded. On his recovery, appearing dissatisfied with Charles V., he was sounded by Morone, the old minister of the Duke Sforza of Milan, as to his willingness to enter into a plot concerted with the other Italian princes, by which the Spanish troops were to be driven out of Milan and Lombardy, and ultimately from all Italy. Pescara was then commander-in-chief of Charles's army in Italy. He was promised the kingdom of Naples as a reward for his assistance in the execution of the plot. Pescara appeared to assent at first, but afterwards secretly informed Charles V., who is said, however, to have had already some previous information on the subject, and who ordered him to take possession of the principal towns of Lombardy, and to arrest Morone, who was soon after put to death. It is reported that Vittoria Colonna contributed by her remonstrances on this occasion, to retain her husband within the bounds of his allegiance to the emperor. Shortly after Pescara died towards the end of 1525, aged thirty-six years, and was succeeded by his cousin the marquis del Vasto in the command of the Imperial army in Italy. Vittoria Colonna, who was inconsolable for the death of her husband, determined on spending the remainder of her life in religious seclusion, although various proposals of a second marriage were made to her. She wrote several poetical effusions, lamenting the death of her husband, and also upon religious subjects. (*Rime Spirituali di Vittoria Colonna*, Venezia, 1548.) Her beauty, her talents, and her virtue, were extolled by her contemporaries, and among others by Michael Angelo, and by Ariosto, in canto 37 of the 'Furioso.' She died in 1547, at Rome, and was styled 'a model of Italian matrons.' (Corniani, Tiraboschi, &c.)

COLONNADE. [CIVIL ARCHITECTURE.]

CO'LONY, in Latin colonia, a word derived from the verb colo, colere, to till or cultivate the ground, originally signified a number of people transferred from one country or place to another, where lands were allotted to them. The people themselves were called Coloni, a word corresponding to our term colonists. The meaning of the word was extended to signify the country or place where colonists settled, and is now often applied to any settlement or land possessed by a sovereign state upon foreign soil. Thus Ceylon and the Mauritius are called British colonies, though they are not colonized by Englishmen, the former being inhabited by natives, and the second by French or descendants of French colonists. The proper notion of the word 'colony' (as determined by the general use of the term) seems to be a tract of land, either wholly or partly colonized, that is to say, possessed and cultivated by natives, or the descendants of natives, of another country, and standing in some sort of political connection with and subordination to the mother country.

The formation of colonies is among the oldest occurrences recorded in history or handed down by tradition. Maritime states, such as those of Phœnicia and of Greece, possessing only a scanty territory, would naturally have recourse to emigration as their population increased. In both these countries the sea afforded a facility for transferring a part of their superabundant citizens, with their families and movables, and their arms, to some foreign coast, either uninhabited or thinly peopled by less civilized natives, who

by good will or by force, gave up to them a portion of their land. The emigration might be voluntary or forced; it was no doubt in many cases the result of civil contentions or foreign conquest, by which the losing party were either driven away, or preferred seeking a new country to remaining at home. The report of some remote fertile coast abounding in valuable productions would decide others. Lastly, the state itself having discovered, by means of its merchants and mariners, some country to which they could trade with advantage, might determine upon sending out a party of settlers and might establish a factory there for the purpose of sale or exchange. In fact commercial enterprise seems to have led both to maritime discovery and to colonization as much as any one single cause. Such seem to have been the causes of the numerous Phœnician colonies which, at a very early date, were planted along the coasts of the Mediterranean. Tyre itself was a colony of Sidon, according to the 'Old Testament,' which calls it the 'daughter of Sidon.' Leptis Magna, near the great Syrtis, was also a colony of Sidon, according to Sallust (*Jugurth.* c. 78). Hippo, Hadrumetum, Utica, and Tunes, were Phœnician colonies, and all of greater antiquity than Carthage. The Phœnician colonies extended along the north coast of Africa as far as the Pillars of Hercules (the Straits), and along the opposite coast of Spain, as well as on the Balearic Islands, and Sardinia and Sicily. Those on the Spanish coast seem to have been at first small settlements or factories for the purpose of trade between the metropolis or mother country and the natives. Several of them, however, such as Gades, by degrees took the trade into their own hands and became independent of the mother country. The foundation of Carthage was an instance of another kind. It resulted, according to tradition, from an emigration occasioned by the tyranny of a king of Tyre. There is another confused tradition of a Phœnician or Canaanite emigration to Mauritania, occasioned by the conquest of Palestine by Joshua, and mentioned by Procopius and Suidas, as well as by some Jewish commentators [BERBERS]. The Phœnicians very early settled in the fertile island of Cyprus, which lay opposite their own coast. Of their settlements in the islands of the Ægean Sea we have only traditions referring to times previous to the war of Troy, and mentioned by Herodotus, and after him by Thucydides, who says that the Phœnicians and the Carians inhabited most of the islands, and carried on piracy, until Minos, king of Crete, drove them away, and planted new colonies. Herodotus says they had once a settlement in the island of Thasus, where they worked the gold mines. They also had a settlement on the island of Cythera (Cerigo), which lay conveniently for their trade with the Peloponnesus. Thucydides (vi. 2, &c.) also mentions that the Phœnicians formed establishments on the promontories and small islands on the coast of Sicily, from which they traded with the native Siculi; but that when the Greeks came to settle in great numbers in that island, the Phœnicians abandoned several of their posts, and concentrated themselves at Motya, Soloeis and Panormus, now Palermo (which last probably had then another name), near the district occupied by the Elymi or Phrygian colonists (who had emigrated from Asia after the fall of Troy, and had built Entella and Egesta), trusting to the friendship of the latter and also to their proximity by sea to their countrymen of Carthage. These three Phœnician settlements however merged afterwards into Carthaginian dependencies. The Phœnicians appear also to have occupied Melita or Malta, and the Lipari islands, one of which retained the name of Phœnicusa. Of the Phœnician settlements in the south part of Sardinia we have the report of Diodorus (v.) and a fragment of Cicero pro Scauro, published by Mai. The Phœnicians and Libyans are said to have been the earliest settlers in Sardinia, and to have founded Caralis (Cagliari) and Sulci. A Phœnician inscription was found in a vineyard at Cape Pula, belonging to the monks of the order of Mercy, and was explained by De Rossi, *Effemeridi Letterarie di Roma*, 1774. But the undoubted field of Phœnician colonization was the north coast of Africa. There the Phœnician settlements seem to have been independent, both of the mother country and of each other. We have the instance of Utica and Tunes, which continued separate communities even after Carthage had attained its great power; Carthage only exercising the hegemony or supremacy. This seems to have been the case among the original Phœnician towns; Sidon, Tyre, Aradus, &c., each a distinct common wealth, forming a sort of federation, at the head of which was the principal city, at first Sidon, and afterwards Tyre. A feeling of mutual regard seems to have prevailed to the last between the various Phœnician towns and colonies, including Carthage, as members of one common family.

The colonies established afterwards by the Carthaginians in the interior as well as on the coast of Africa, Sicily, and Spain, were upon a different plan from those of the Phœnicians: they were made through conquest and for the purpose of keeping the country in subjection, like those of the Romans [CARTHAGE], with the remarkable exception of the emigration colonies taken by Hanno to the west coast of Africa.

The earlier Greek colonies appear to have owed their origin to the same causes, and to have been founded upon the same plan as those of the Phœnicians. Thucydides (I.) says, that 'after the Trojan war, and the subsequent conquest of Peloponnesus by the Dorians, Greece being restored to tranquillity, began to send out colonies. The Athenians, whose country was overflowing with people from other parts of Greece, who had flocked thither for security, began to send out colonies into Ionia and to many of the islands; the Peloponnesians sent theirs to Italy, Sicily, and some parts of Greece. But all these colonies were sent after the Trojan war.' The Dorians from Megaris, Argos, Corinth, and other places, colonized some of the larger islands, part of Creta, Rhodes, Corcyra, as well as Ægina, Cos, &c. They founded the Hexapolis on the south-west coast of Caria, in Asia Minor, which district took from them the name of Doris. A colony of Lacedæmonians founded Cyrene. The Megarians founded Chalcedon, Byzantium, Selymbria, Heraclea, and other places on the coasts of the Euxine. Sicily also was chiefly colonized by Dorians. Syracuse was a Corinthian colony, which afterwards founded Acræ, Camarina, &c.; Gela was a colony of Rhodians and Cretans, and Agrigentum was a colony from Gela. The Megarians founded Selinus. The Chalcidians built Naxus, which was the first Greek settlement in Sicily, and afterwards took Leontini and Catana from the Siculi. For a more detailed account of the numerous Dorian colonies see K. O. Müller's *History of the Doric Race*.

The Ionians from Attica, another great branch of the Hellenic stock, after the death of Codrus, the last king of Athens, emigrated to the west coast of Asia Minor, which took its name from them [IONIA], and established there twelve cities or communities, which quickly rose to a high degree of prosperity, and formed a kind of federal union. About eighty years before, the Æolians and Achæans, two nearly allied races, being driven away from Peloponnesus by the Dorians, had emigrated to the coast of Asia Minor, where they formed colonies from Cyzicus on the Propontis as far southwards as the Hermus. Phocæa was the most northern of the Ionian towns on the borders of Æolis. The Æolians also colonized the islands of Lesbos, Tenedos, and others in that part of the Ægean. These emigrations were posterior to the time of Homer, who mentions other people as occupying that coast. The Athenians at a later date colonized Eubœa, where they founded Chalcis and Eretria, and they also sent colonies to Naxos, to the islands of Ceos, Siphnos, Seriphos, and other islands of the Ægean. Many of these colonies having thriven and increased, became colonizers in their turn. The enterprising mariners of Phocæa formed various colonies, the most celebrated of which is Massilia on the south coast of Gaul. The Chalcidians of Eubœa founded Cumæ, on the west coast of Italy, in the country of the Opici. Pirates from Cumæ founded Zancle, but a fresh colony of Samians and other Ionians escaping from the Persian invasion, in the time of the first Darius, took Zancle, and were afterwards in their turn dispossessed by Anaxilas, tyrant of Rhegium, who called the town Messene (now Messina), from the name of his original country in the Peloponnesus. The Æolians founded Dicæarchia, afterwards Puteoli, and they with the Cumæans are believed to have founded Parthenope (Naples). Ionian colonists settled on the coast of Sardinia.

The Greek colonies on the east coast of Italy, setting aside the confused traditions of Arcadian immigrations, Pelasgian, &c., supposed to have taken place before the Trojan war, consisted chiefly of Dorians and Achæans from the Peloponnesus. Croton, Sybaris, and Pandosia were colonies of the latter. Tarentum was a colony of Lacedæmonians, and Locri Epizephyrii of the Locrians. Greek colonies were settled both on the north and east sides of

the Pontus (Black Sea), and also on the north coast in the modern Crimea. [Bosporus.]

As to the relations subsisting between the colonists and the natives or prior inhabitants of the countries which they occupied, it was undoubtedly in most cases strictly in accordance with the right of the strongest. Either the natives withdrew into the interior and left the ground to the new occupants, as the Siculi did in several instances, or they resisted, in which case, when overpowered, the men were exterminated or reduced to slavery, and the conquerors kept the women for themselves. In some instances the older inhabitants were reduced to the condition of serfs or bondmen to the new settlers. The records of authentic history do not present us with an instance of any colony being settled in a country where there were not previous inhabitants. The consequence of the immigration of a new race, who seek to possess themselves of the land, must be the extermination or gradual decay of the prior race, unless the old inhabitants are made slaves. So far as we trace the history of Greek colonies in the scattered fragments of antiquity, such were the consequences of their colonial settlements. On the coast of Italy it would appear that the Greeks pursued a more humane or more politic course. They are said to have allied themselves to and intermarried with the natives, and by their superior civilization to have acquired great influence. It may here be remarked that the Greeks, so far from being averse to foreign intermixtures, as some have said, mingled their blood freely with that of all the nations with whom they came into contact, and thus the civilization of the Hellenic stock was gradually introduced among nations less advanced in the useful arts.

What were the relations between these Greek colonies and the mother country, and between those colonies that were of a kindred race?

This may be gathered pretty clearly from Thucydides. Epidamnus was a colony of Corcyra: but the leader of the colony (οἰκιστής), the founder of the colony, or the person under whose conduct it was settled, was a Corinthian, who was called or invited, says Thucydides, from the mother city (called by the Greeks the metropolis, μητρόπολις, or parent state), according to an antient usage. Thus it appears that if a colony wished to send out a new colony, this was properly done with the sanction of the metropolis. Some Corinthians and other Dorians joined in the settlement of Epidamnus, which became a thriving community, and governed itself independently of both mother countries. In the course of time, however, civil dissensions and attacks from the neighbouring barbarians induced the Epidamnians to apply to Corcyra, as their metropolis, for assistance, but their prayers were not attended to. Being hard pressed by the enemy, they turned themselves to the Corinthians, and gave up their town to them, as being the real founders of the colony, in order to save themselves from destruction. The Corinthians accepted the surrender, and sent a fresh colony to Epidamnus, giving notice that all the new settlers should be on an equal footing with the old settlers: those who did not choose to leave home were allowed to have an equal interest in the colony with those who went out, by paying down a sum of money, which appears to have been the price of allotments of land. Those who went out gave their services; those who stayed at home gave their money. 'Those who went out,' says Thucydides, 'were many, and those who paid down their money were also many.' For the moneyed people it was in fact an affair of pure speculation. The Corcyræans, themselves originally a colony from Corinth, having become very powerful by sea, slighted their metropolis, and 'did not pay to the Corinthians the customary honours and deference in the public solemnities and sacrifices, as the other colonies were wont to pay to the mother country.' They accordingly took offence at the Corinthians accepting the surrender of Epidamnus, and the result was a war between Corcyra and Corinth. (i. 24.)

Again, the Corcyræan deputies, who were sent to court the alliance of the Athenians against Corinth, stated, in answer to the objection that they were a colony of Corinth, that 'a colony ought to respect the mother country as long as the latter deals justly and kindly by it, but if the colony be injured and wrongly used by the mother country, then the tie is broken, and they become alienated from each other, because, said the Corcyræans, colonists are not sent out as subjects, but as free men having equal rights with those who remain at home.' (i. 34.) This shows the kind of relation as understood by the Greeks between the metropolis and its colonies. The colonies were in fact sovereign states, attached to the mother country by ties of sympathy and common descent, so long as those feelings were fostered by mutual good-will, but no further. The Athenians, it is true, in the height of their power, exacted money from their own colonies, as well as from the colonies of other people, and punished severely those who swerved from their alliance, such as Naxos; but this was not in consequence of any original right of dominion as supposed to belong to the mother country over the colony. Many of the colonies, especially the earlier ones, which were the consequence of civil war or foreign invasion, were formed by large parties of men under some bold leader, without any formal consent being asked from the rest of the community: they took their families, their arms, and their movables with them, to conquer a new country for themselves; they left their native soil for ever, and carried with them no obligations or ties. Those that went off in more peaceful times, by a common understanding of the whole commonwealth, went also away for ever, and freely and voluntarily, though under a leader appointed by the parent state, to seek a country where they could find an easier subsistence than at home. In either case it was a complete separation of a member from the body. When the Athenians, in later times, took possession of parts of Eubœa (Thucyd. i. 114), and of Ægina (ii. 27), of Melos (v. 116), and shared the lands among their own citizens who went there, the relationship thus formed was of a different kind. In the case of Ægina the whole population, which was of Hellenic stock, was turned out, and a body of Athenians occupied their place, with the express object of being as a body or community subordinate to the state of Attica, in order to prevent the annoyance to which Attica had long been subject by the proximity of an independent island so well situated both for the purpose of annoying Attica and for self-defence.

That the colonies of a kindred race should feel a common interest in opposition to those of a rival branch is natural, and is proved among other instances by the case of the deputies from Egesta in Sicily, who, while requesting the assistance of the Athenians against the Syracusans and Selinuntians, urged as an additional plea that the Leontines, who were originally Chalcidians, and therefore akin to the Athenians, had been expelled from their town by the Syracusans, and showing that it was the interest of the Athenians to assist a kindred people against the prevailing power of the Dorian colonies in Sicily. (Thucyd. vi.)

Before we pass to the Roman colonies, we must say something of the system of colonization among the other inhabitants of the Italian peninsula in the Ante-Roman times. The Etruscans extended their conquests north of the Apennines in the great plain of the Po, and founded there twelve colonies, the principal of which was Felsina (Bologna). They afterwards, having defeated the Umbrians, many years before the assumed foundation of Rome, extended themselves into East and South Italy, penetrated into Latium, and took Campania from the Oscans, where they founded likewise twelve colonies, the principal of which was Capua. The Etruscans, being skilled in architecture, surrounded their towns with solid walls built of massive stones without any cement; they were also well versed in agriculture and hydraulics, and several of the earliest drains and canals in the Delta of the Po are attributed to them. They subjected, but at the same time necessarily civilized, the people among whom they settled. Their colonies seem to have formed independent communities, though allied by a kind of federation. The Etruscans also founded colonies in the Picenum, such as Hatria [Atri] and Cupra Montana and Cupra Maritima. They took from the Ligures the country around the gulf now called Della Spezia, and founded the city of Luna. They likewise sent colonies to the islands of Elba and Corsica, for the Etruscans were a commercial as well as agricultural people; they navigated the sea, and in the sixth century B.C. they defeated the Phocæans, and drove them out of Corsica. The Etruscans civilized Italy by means of their colonies, but, unlike Rome, they did not keep them united under a central power.

The Sabini, an agricultural and pastoral people, living in a mountainous country, sent colonies in very remote times to other parts of Italy. It was their custom, after the lapse of a certain number of years, to celebrate solemn sacrifices

in the spring season, and to consecrate to the gods a number of young men, who were to quit their native land, and proceed under the auspices of Heaven to seek a new country. In this manner the Piceni and the Samnites are said to have been colonies of the Sabini. The Samnites in their turn sent out other colonies, and the Lucanians were one of these. The Samnites as well as the Sabini were entirely given to agricultural pursuits.

Rome, in the earliest ages of the republic, adopted the system of sending out colonies to the conquered countries. But the Roman colonies were different from those of most other people, inasmuch as they remained strictly subject to the mother country, whose authority they were the means of enforcing upon the conquered nations. They were, in fact, like so many garrisons or outposts of Rome. Servius (Æn. i. 12) gives the following definitions of a colony, taken from much older authorities:—'A colony is a society of men led in one body to a fixed place, furnished with dwellings given to them under certain conditions and regulations.' Again, 'Colonia is so called a colendo; it consists of a portion of citizens or confederates sent out to form a community elsewhere by a decree of their state, or with the general consent of the people from whom they are departed. Those who leave without such a consent, but in consequence of civil dissensions, are not colonies.' The notion of a Roman colony seems to be this: the colonists occupied a city already existing; and this, with perhaps one exception or two, was the general character of the Roman colonies in Italy Proper. When the Romans afterwards extended their conquests into countries where there were no regular towns, or where the population being fierce and hostile, the Roman settlers must be ever on their guard against them, they built new towns in some favourable position. Such was the case in several parts of Gaul, Germany, Dacia, &c. But the Roman colonies in Italy consisted of Roman citizens, who were sent as settlers to fortified towns taken in war, with land assigned to them at the rate of two jugera of arable land or plantation for each man, besides the right of pasture on the public or common land. The old inhabitants were not ejected, or dispossessed of all their property; the general rule was, that one-third of the territory of the town was confiscated and distributed among the colonists, and the rest was left to the former owners, probably subject to some charges in the shape of taxes, or services. The colonists constituted the *populus* of the place; they alone enjoyed political rights and managed all public offices, the old inhabitants being considered as the plebs. The ownership of the publicum or public property, including the pasture land, was probably also vested in the new settlers. It is natural to suppose, that for some generations at least, no great sympathy existed between the old and the new inhabitants, and hence we frequently hear of revolts of the colonies, which means, not of the colonists against the mother city, but of the old inhabitants, who rose upon and expelled the colonists. But these events generally ended by a second conquest of the place by Roman troops, when the old inhabitants were either put to the sword or sold as slaves, or, under more favourable circumstances, lost at least another third of their property. In later times, during the civil wars of Rome, new colonies were sent by the prevailing party to occupy the place of the former ones; and the older colonists were then dispossessed of their property either wholly or in part, just as they had dispossessed the original inhabitants. Hence the saying, 'Veteres migrate coloni.' Sometimes colonies, especially at a great distance from Rome, having dwindled away, or being in danger from the neighbouring populations, asked for a reinforcement, when a fresh colony was sent, to whom the old colonists gave up one-third of their property. Each of the older colonies, it is observed by Gellius (xvi. 13), was a Rome in miniature; it had its senators called Decuriones, its Duumviri, Ædiles, Censores, Sacerdotes, Augurs, &c.

A distinction must here be made between the Roman colonies and the Latin colonies. The former had all or nearly all the rights of the citizens of Rome, although Sigonius and some others pretend that they had not the jus suffragii; and yet, in various passages of Livy and others, colonists are styled cives and Romæ censi. The Latin colonies had not the jus Quiritium, but only the jus Latii. All those, however, who filled magistrates' offices in Latin colonies became Roman citizens. Such was the case with Tibur, Præneste, &c. The towns of Transpadane Gaul, as a reward for their fidelity to Rome, obtained the rank of Latin colonies without any colonists being sent to them.

There were also military colonies, which consisted of soldiers, to whom land was given instead of pay and provisions, as a resting-place after their campaigns. Sulla appears to have been the founder of these, and Cæsar and Augustus added greatly to their number. These colonies are distinguished by having military ensigns on their coins, while the Coloniæ Togatæ, or citizen colonies, have a plough on theirs. (Heinec. *Antiqu. Roman. Syntagma.*) The coins of some colonies have both marks, which means that the original colony consisted of citizens, after which a second was sent, composed of military. In Tacitus (*Annal.* i.) the veterans complain that, after their long service, they were rewarded only with uncultivated lands, situated in the neighbourhood of the enemies of the empire.

The system of colonies adopted by Rome had a double political object; to secure the conquered countries, and to satisfy in part the claims of its own poorer citizens, and to get rid of turbulent characters. The importance of the Roman colonies to the empire is well expressed by Cicero, who calls them 'propugnacula imperii et speculæ populi Romani.' Such they doubtless were, and at the same time they were the germ of the civilization of Northern and Western Europe. A nation of civilized conquerors, whatever evils it may inflict to gratify its own cupidity, confers on the conquered people unintentionally still greater benefits. By their colonies in Spain, Gaul, on the banks of the Rhine, and in Britain, the Romans established their language and their system of administration. The imprint of their empire is indelibly fixed on the existing nations of Europe.

The difference between Colonia and Municipium is that the latter was a town of which the inhabitants, being friendly to Rome, were left in undisturbed possession of their property and their local laws and political rights, and obtained moreover the Roman citizenship, either with or without the right of suffrage; for there were several descriptions of Municipia. [MUNICIPIUM.] The colonies, on the contrary, were all governed according to the Roman laws. The Municipia were foreign limbs engrafted on the Roman stock, while the colonies were branches of that stock transported to a foreign soil.

Under the later Roman Emperors, the difference between Colonia and Municipia became obliterated, and all were governed alike according to the Roman law, and a uniform system of administration. Augustus gave the right of Roman citizenship to all Italy. Antoninus Caracalla bestowed it upon all freemen, subjects of the empire. (For the Roman colonies see Niebuhr, vol. ii.; Manutius *de Civitate Romana*; Sigonius *de Ant. Jure Ital.*; Heineccius, *Syntagma*, *&c.*)

The northern tribes who overthrew the western empire did not found colonies; they overran or conquered whole provinces, and established new states and kingdoms. The same may be said of the Saracen conquests in Asia and Africa. But, after a lapse of several centuries, when Europe had resumed a more settled form, the system of colonization was revived by three maritime Italian republics, Pisa, Genoa, and Venice. Their first settlements on the coasts of the Levant and Egypt were mercantile factories; which the insecurity of the country soon induced them to convert into forts with garrisons, in short into real colonies. The Genoese established colonies at Famagosta in Cyprus, at Pera and Galata, opposite to Constantinople, at Caffa in the Crimea, founded in 1266; they also acquired possession of a considerable extent of coast in that peninsula, forming a district subject to Genoa under the name of Gazaria. Another tract on the coast of Little Tartary, called Gozia, was also subject to the Genoese, who had then the colony of Cembalo. In the Palus Mæotis they had the colony of La Tana, now Azof. On the south coast of the Euxine they possessed Samastro or Amastri; they had also a factory with franchises and their own magistrates at Trebizond, as well as at Sebastopolis. These colonies were governed by consuls sent from Genoa, and the order and justice of their administration have been much extolled. In the archives of St. George, at Genoa, there is a valuable unpublished MS. containing the whole colonial legislation of the Genoese in the middle ages.

The Pisans, having taken Sardinia from the Moors, sent colonies to Cagliari and other places. Their settlements in the Levant were mere commercial factories.

The Venetians established colonies in the Ionian islands, Candia, and Cyprus. Their system resembled that of Rome; they ruled, by means of their colonies and garrisons, over the people of those islands, whom they left in possession of their municipal laws and franchises. These were not like the settlements of the Genoese, merely commercial establishments—they were for conquest and dominion; in fact, Candia and Cyprus were styled kingdoms subject to the Republic. The Venetians had also at one time factories and garrisons on various points of the coasts of the Levant, but they lost them in the Morea, Eubœa, Syria, and the Euxine, either through the Genoese, or afterwards by the arms of the Ottomans. We can hardly number among their colonies the few strongholds they had until lately on the coast of Albania, such as Butrinto, Prevesa, Parga, &c., any more than those possessed by the Spaniards and Portuguese on the coast of Barbary, Oran, Melilla, Ceuta, &c. They were merely forts with small garrisons, with no land attached to them. The name used in the Mediterranean for such places is presidii; and they are often used as prisons for criminals. An essential qualification of a colony is that it should have and cultivate land, and consist at least in part of civilians. The great question agitated now in France, with regard to Algiers, turns upon this,—whether the French are merely to occupy the towns on the coast as military and in some degree commercial colonies, or establish a great agricultural colony in the interior, by taking possession of and cultivating the land. This question, as well as that of most modern colonies, touches several points both of justice and policy. When a colony is sent to a country occupied by a few hunting tribes, as was the case in part of North America at the time the English settled there, and as is now the case in New Holland, the taking possession of part of the land for the purpose of cultivation is attended with the least possible injury to the aborigines, while, at the same time, it has in its favour the extension of civilization upon a new shore. The savages generally recede before civilized man; a few of them adopt civilization, and the rest become gradually extinct. When the limits are confined, the progress towards extinction is exceedingly rapid. The aborigines of Van Diemen's Land are now, as we are informed, reduced to a very small number, and perhaps that small number may, at this moment, have been reduced to nothing. This, however melancholy in one point of view, has been, from the earliest times, the great law of the progress of the human race. But the case is much altered when the natives are partly civilized, live in domestic societies, have settled habitations, and either cultivate the land or feed their flocks upon it. The colonists in such case do what the Romans did in their colonies; they take part of the arable land, or the whole of the common or pasture land, and leave to the natives just what they please, and if the latter resist, they kill them. Whether this be justice every man may ask himself. Such however has been the system pursued by the Spaniards in various parts of America, by the Dutch at the Cape and the Molucca islands, and by all maritime nations in some part or other of Asia, Africa, or America; and this is now attempted to be done by the French against the Arabs and Kabyles of the state of Algiers. The case may be one of greater or less oppression; according as the land is either enclosed and cultivated, or merely used for pasture or the chase, and according as the natives are more or less numerous in proportion to the land, colonization may proceed on a milder or harsher system; still the question of justice remains the same, unless the natives be willing to part with their land by amicable arrangement. This system of purchase from the natives has been practised both by the English and Anglo-Americans in North America; but though it has the specious name of bargain, it has often been nothing more than a fraud, or sale under compulsion. The man of Europe has been long accustomed to regard the possession of the soil as that which binds him to a place, and gives him the most secure and least doubtful kind of property. His habits of accumulation, and of transmitting to his children a permanent possession, make him covet the acquisition of land. In whatever country he has set his foot, and once got a dominion in the soil, neither contracts, nor mercy, nor feelings of humanity, nor the religion which he carries with him, have prevented him from seizing on the lands of the owners, and punishing their resistance with death.

The modern colonies in Asia and America have been formed partly on the Roman or Venetian and partly on the Genoese or old Phœnician principle. When the Portuguese first began their voyages of discovery in the 15th century, they took possession of some islands or points on the coasts of Africa and of India, and left there a few soldiers or sailors under a military commander, who built a fort to protect the trade with the natives, and afterwards also to keep those natives under a sort of subjection. No great emigrating colonies were sent out by them, except in after times to Goa and the Brazil, which latter is really a colony of Portuguese settlers. The Spaniards, on the contrary, when they discovered America, took possession of the soil, and formed real colonies kept up by successive emigrations from the mother country. In the West India Islands the natives were made slaves, and by degrees became extinct under an intolerable servitude. On the mainland they were exterminated in some places, and in others reduced to the condition of serfs or tributaries. The Spaniards colonized a great part of the countries which they invaded. The Spanish American colonies had for their objects both agriculture and mining. The North American colonies were the consequence of emigration, either voluntary or produced by religious persecution and civil war at home. The Puritans went to New England, the Quakers to Pennsylvania, and the Cavaliers to Virginia. They formed communities under charters from the crown, and had local legislatures, but were still subject to the sovereignty of the mother country. The mother country sent its governors, and named, either directly or indirectly, the civil functionaries. The precise amount of obedience that the colonies then owed to the mother country cannot be exactly defined. The American revolution only showed that it did not extend to a certain point, without showing how far it did extend.

A new feature has appeared in modern European colonization, that of penal colonies, which was an extension of the principle of the presidii on the coast of Barbary, already mentioned. Convicts were sent by England first to North America, and afterwards to New Holland, by France to Guiana, by Portugal to the coast of Angola, and by the Dutch to Batavia. They were either employed at the public works, or hired to settlers as servants, or were established in various places to cultivate a piece of land, for which they paid rent to the government. The policy of penal colonies has been much discussed. They may afford a relief at least temporary, but at a great cost to the mother country, by clearing it of a number of troublesome and dangerous characters, especially so long as criminal legislation and the system of prison discipline continue as imperfect as they are at present in most countries of Europe; but with regard to the convicts themselves, and the prospect of their reformation, everything must depend upon the regulations enforced in the colony by the local authorities. If we look however at the horrid places of confinement to which convicts are sent by most continental governments, and which are sinks of every kind of corruption and wretchedness, we cannot help feeling disposed to think more favourably of such colonies, under proper regulations and discipline, and to prefer the penal colonies of Great Britain to such ill-regulated places of punishment, which do not even affect to be places of reformation.

With regard to the advantages resulting from colonies to the mother country, they appear to be, the extension of trade and exchange, the consequent employment of a number of additional hands, and the giving the means of acquiring property to many who have no chance at home. Many individuals also realize fortunes in the colonies, with which they afterwards return home, and thus add to the national wealth. Much has been written upon this subject by political and economical writers, and the advantages of colonies have been exaggerated by some, and perhaps too much underrated by others. In a general point of view, as connected with the progress of mankind, a busy prosperous colony on a land formerly wild and desert is undoubtedly a cheering sight. Commercial colonies or factories are likewise useful for protecting traders in remote and half-barbarous countries. But the proper question as to the policy of colonies now is this;—should a state form colonies in its collective or sovereign capacity, or should it put obstacles in the way of its citizens forming colonies by voluntary associations, or should it favour such associations by offering facilities to them, or at least putting no obstacles in the way; and should the state allow such associations of

emigrants to form such a political community as they choose? This subject is properly discussed under the head of EMIGRATION.

An account of the great modern colonies is given under the respective heads, such as BARBADOES, BRAZILS, CANADA, CAPE OF GOOD HOPE, JAMAICA, &c.

The colonies of England consist of British North America, the British West India Islands, with the Bahamas and Bermudas, and British Guiana in S. America; Sierra Leone, Cape Coast, and Cape of Good Hope in Africa; the islands of St. Helena, Mauritius, Ceylon, Pulo Penang, Sincapore, and Malacca; various settlements on the coasts of Australia, and Tasmania, or Van Diemen's Land. The vast possessions of the East India Company in India cannot be called colonies, though they are dependencies of Great Britain, by which name also Gibraltar and Malta must be designated.

France has the French West India Islands, and French Guiana in America; Senegal, on the Coast of Africa; the island of Bourbon; and Pondichery, in the East Indies.

Spain has lost her vast dominions in Mexico and South America, but has retained the fine islands of Cuba and Puerto Rico: she has also the Philippine Islands.

Portugal has lost the Brazils, but has still numerous settlements on the coast of South and East Africa, at Angola, Benguela, Loango, and on the Mozambique; but these settlements are the most degenerated of all European colonies. In India the Portuguese retain Goa, and they have a factory at Macao, and a settlement on the northern part of the island of Timor.

The Dutch have the islands of Curaçao and St. Eustaz, and Surinam in Guiana. In Asia they have the great colony of Batavia with its dependencies, various settlements on the coasts of Borneo, Sumatra, Celebes, and the Molucca Islands.

The Danes are possessed of the islands of St. Crus and St. Thomas in the West Indies; Christianburg, near Accra, on the Guinea coast; and Tranquebar in the East Indies.

The Swedes have the island of St. Bartholomew in the West Indies.

A society of North American philanthropists has founded since 1821, on the Guinea coast, east of Cape Mesurado, a colony of emancipated negroes, who have been transferred thither from the United States. The colony is called Liberia, and has two small towns, Monrovia and Caldwell.

On the subject of modern colonies, Raynal, *Histoire des Etablissemens des Européens dans les deux Indes*, may be useful, though it is often exaggerated and turgid; but the best authorities are the original accounts of the various discoverers and founders of the colonies, such as have been published by Navarrote for the Spanish, Barros for the Portuguese, &c.

The *English Colonies* have, as a general rule, local legislatures, elected by the people, and a governor and council named by the king. The foreign commerce of these colonies is regulated by the sovereign authority of the mother country, and put on such a footing as generally to allow the products of the colonies admission into British ports on more favourable terms than those of other countries. To the amount of this protecting duty, the colonies then have the advantage of a monopoly in the markets of the mother country. The old strict colonial system, of excluding foreign countries from direct commercial intercourse with the colonies, had the double object in view of securing all the supposed advantages of the exchange of British for colonial products, and giving employment to the British merchant navy. The rigour of this system however has gradually relaxed, and given way to clearer views of self-interest. Still the colonial system, as maintained by Great Britain, presents in many instances examples of foreign possessions which are expensive to the country without any apparent corresponding advantages; and also of foreign possessions, the trade with which is still encumbered with regulations either unfavourable to the producers of the mother country, or favoured by discriminating duties which are an unfair tax on the domestic consumer. The expenditure in some of the colonies for the purposes of administration and protection is beyond the means of the colonial revenues to meet, and the deficiency must of course be supplied by the parent state. The immense patronage which colonial possessions put at the disposal of the government is naturally one reason why colonies are looked upon as profitable things by those who participate in the advantages of posts and places in them. On the other hand, those who only contribute to these expenses may not unreasonably ask for some proof of solid advantage to the nation in return for this annual outlay. Setting aside the interests of those concerned in the administration of the colonies, it is asked, in many cases, what advantage does the rest of the nation receive? So far as colonies may be desirable posts for protecting British commerce and shipping, the advantage of maintaining them may be fully equivalent to the expense. But in every particular instance the question as to the value of a modern colony to the mother country (omitting, as before mentioned, the value of the patronage to those who confer places in the colonies and the value of the places to those who receive them) is simply this;—what advantage is this said colony to the productive classes of the country and to those who consume the products of the colony? a question not always easy to answer; but this is the question, the solution of which must decide whether a colony ought to be maintained or not, if we look only to the interests of the mother country. If we look to the interests of the colony, it may be in many and certainly is in some cases, the interest of the colony to remain as it now is, under the protection and sovereign authority of the mother country. But again the question recurs, what is the advantage to the mother country? If some advantage cannot be shown, the maintenance of a useless colony is a pure act of national benevolence towards the colony and to those few of the mother country who have places in it. If our present relation with a colony such as Jamaica or Canada entails any expense on the mother country, we may ask whether all the commercial advantages that result from this relation would not be equally secured, if only the free commercial relation existed and that of administration were to cease. In support of this view, it is shown that the commerce of Great Britain with the United States, now free and independent, has increased most wonderfully since the separation, and probably more rapidly than it would have increased under the colonial system. This being the case, a similar increase might be anticipated in the trade with all those foreign possessions whose trade is really of any importance. This argument, to which it is difficult to reply, is met by saying that if we give up those colonies that cause expenditure on the part of the mother country, some of them at least would be a prize for other nations, who would exclude us from the commerce of those former colonies, or allow it only on unfavourable terms; or that these colonies would throw themselves into the arms of foreign nations, and the same result would follow. To this it is replied, that no other nation is in a condition to take on itself the management of expensive colonies; that nations, like individuals, will, if let alone, buy where they can buy cheapest, and sell where they can sell dearest; and that if we should be shut out from the commerce of any of our present colonies, there are equally good or better markets from which we are now in part or altogether excluded owing to those very regulations, which only exist because we have colonies to maintain.

The colonial administration of the British colonies is an important department of the general administration. At the head of it is the principal colonial secretary, who is one of the three secretaries of state, assisted by two under secretaries.

COLOQUI'NTIDA. [CUCUMIS.]

COLORA'DO, a river of Mexico, falls into the northern extremity of the Gulf of California, somewhat south of 32° N. lat. To judge from its appearance at its mouth, we should not suppose this river to have a course of 230 leagues or about 640 English miles, which Humboldt assigns to it; for it has often not more than six feet of water, and its breadth at low water is hardly more than 200 yards. Two low islands at its mouth are called, by Hardy, Montagu and Gore. Its banks here are low, but the western is somewhat higher than the eastern. About 30 miles from its mouth, Hardy found only two feet of water in the channel. Sixty miles from its mouth in a straight line, the Colorado is joined by the Rio Gila, a river which runs east and west for above 300 miles, and has its source in the Sierra Mogollon, the southern extremity of the Rocky mountains, about 34° 20′ N. lat., and 108° W. long. The place where both rivers unite has been visited by Dr. Coulter, who states that the country between the rivers, as well as on both sides of them, is a sandy desert, without potable water, and subject to excessive heat: the thermometer in one instance rose to 140°.

The remainder of the course of the Rio Colorado is entirely unknown, the country having only been visited by

two monks, according to whose reports, as Humboldt tells us, the river is formed by two upper branches, the northern, Rio Zaguananas, rising in about 40° N. lat., and the southern, Rio Nabajoa, rising in about 39° N. lat. Both descend from the western declivity of the Rocky Mountains. [COLUMBIA RIVER.] These monks also report that they found on the banks of the Rio Yaquesila, a tributary of the Colorado, a nation of natives, the Moqui, far advanced in civilization. They passed there through a considerable town, which had two large squares, and a straight and wide street; the houses had several stories, and flat roofs, on which the people assembled in the evenings. The fact however seems to be very doubtful. Dr. Coulter does not mention it, though he had frequent opportunities of communicating with the American hunters, who traverse these countries in search of otters. (Humboldt, Hardy, Dr. Coulter, in *London Geogr. Journal*, vol. v.)

COLOSSE'UM. [AMPHITHEATRE.]

COLOSSIANS, EPISTLE TO THE, a canonical epistle of the New Testament, addressed by St. Paul to the Christians of Colossæ, a city of Phrygia. The date generally assigned to this epistle by the commentators and critics is A.D. 62. (*Tablettes Chronologiques*, par l'Abbé Lenglet Dufresnoy, tome ii. p. 211. Dr. Adam Clarke's *Succession of Sacred Literature*, vol. i. p. 89). Some say A.D. 63, or the 9th of Nero. In the Dissertations on the Harmony of the Gospels, by the Rev. Mr. Greswell (vol. ii. pp. 63—66), it is shown that the Epistles to the Ephesians, to the Philippians, and to Philemon, were written by St. Paul at the same time as the one to the Colossians, namely, in A.D. 60, nearly at the termination of the apostle's first imprisonment at Rome; and Epaphroditus in Philemon is considered by Mr. Greswell to be the same person as Epaphras in Colossians. From the expressions in ch. i. ver. 4, 7, 9, and ch. ii. 1, it is inferred by some that St. Paul himself was personally unknown to the Christians of Colossæ; but others, especially Dr. N. Lardner (*Credibility Gos.*), who argues on the statements of Theodoret (tom. iii. p. 342), assert that St. Paul preached and planted the church at this city. According to Eusebius, this city was one of three which, in the 10th year of Nero (that is, a year after the reception of this epistle), were totally destroyed by an earthquake. The chief object of St. Paul in this epistle appears to have been to exhort the Christians of Colossæ to adhere steadfastly to the doctrines which he taught, and to reject the opinions of the Jews and the Pagan philosophers. The concluding sentence of the fourth chapter states that the conveyance of this address was committed to Tychicus and Onesimus. For a list of published sermons on texts from Colossians, see Watt's *Biblioth. Brit.* (Eichhorn, Michaelis, Horne.)

COLOSSUS. [STATUE.]

COLOUR, in Optics. [LIGHT.]

COLSON, JOHN, born about the beginning of the eighteenth century, studied at Emmanuel College, Cambridge, and was master of the free-school at Rochester till 1739, when he succeeded Sanderson as Lucasian professor at Cambridge. He died in 1760 He is worthy to be remembered for his English edition of Newton's Fluxions, London, 1736; and his translation of the Analytical Institutions of Maria Agnesi, which lay in manuscript till 1801, when it was published by the Rev. John Hellins at the expense of Baron Maseres.

COLTSFOOT, the common name of TUSSILAGO FARFARA.

CO'LUBER, a sub-genus of Ophidians, or serpents. The genus *Coluber* of Linnæus comprised all the serpents whether venomous or not, whose scales beneath the tail are divided into two, or more properly speaking, arranged in pairs; but the term is generally applied by Cuvier and other authors to those serpents which have transverse plates on the belly, and the plates under the tail forming a double row, a flattened head with nine larger plates, teeth almost equal, and no poison-fangs.

Laurenti placed the *Colubridæ* between the rattlesnakes (*Caudisona*) and the vipers. Scopoli's genera were those of Linnæus. Lacépède placed the *Colubridæ* at the head of his nine genera of serpents, and next to them came the boas and rattlesnakes. Alexander Brongniart made them the last but one of his six genera of Ophidians, arranging them between the vipers and the boas. Latreille gave the genus a place between *Chersydrus* and *Dipsas* in his family of *Anguivipères*. Daudin comprehended 172 species under the genus. In the synoptical table of Duméril and Bibron, Cuvier is made to place it between *Dipsas* and *Cerberus*. Oppel subdivides his section (the second) the *Squammata* (Ecailleux) into seven families, of which the *Colubridæ* (Couleuvrées) are the last, coming immediately after the *Pseudo-vipères*. Merrem divided the serpents into two sub-tribes: in the first sub-division, the *innocui*, or serpents without venom, of the first tribe (*Gulones*), *Coluber* appears between *Scytale* and *Hurriah*. De Blainville separated the serpents into *Dipodes* and *Apodes; Coluber*, coming immediately after *Boa*, is placed in the innocuous division of these *Apodes*. Mr. Gray, in 1825, divided the Ophidians, his fourth order of reptiles, into two great groups, venomous and innocuous, and the *Colubridæ* were placed by him between the *Hydridæ* and *Böidæ*, the three families of the second group. Dr. Harlan, in the same year, made the Ophidians, his fourth order, contain six genera, and placed *Coluber* between *Ophisaurus*, his first, and *Vipera*, his third genus. Mr. Haworth, in the same year, arranged the genus between *Scytale* and *Dryinus*, among the true serpents (*Apoda epalpebrata*, or serpents without eye-lids), and under the innocuous branch of the *Gulonia*. Fitzinger (1826) placed the *Colubröides* between the *Pythonöides* and the *Bungaröides*, in his comprehensive third tribe *Monopnoa squammata*. Ritgen (1828) arranged the *Colubridæ* and the *Böidæ* under his *Macrostomata*, the third sub-partition of the first sub-division, *Holodontaspistes* (with entire teeth), of his third sub-order of scaly serpents. Wagler, whose untimely loss all zoologists deplore, published (1830) his 'Naturaliches System der Amphibean.' He makes his fourth order, the serpents, consist of one family only, comprehending ninety-seven genera, and places *Coluber* the forty-ninth between *Spilotes* (Wagler), and *Herpetodrys* (Böié). In 1831, Mr. Gray, in Griffith's 'Cuvier,' published a synopsis, in which he makes some alterations in his original classification. The *Squammata* form the second section, and the *Ophidians* its third order, which is divided into two sub-orders, the venomous and innocuous, the upper jaw of which last is toothed, but without fangs, or with very small ones: in the latter sub-order, the *Colubridæ* are again placed with the boas and the hydras.

In 1832 Professor John Müller, of Bonn, published his system: the Colubers are arranged by him immediately after *Dryinus*, as the last of the *Isodonts*, the third family of his second order, uniting the *Macrostomes* which correspond to the *Heterodermes* of Duméril.

The species of the genus as left by Cuvier, are very numerous, and their geographical distribution is very wide. The foreign species are some of them remarkable for their vivid colouring, and others for the regularity of the pattern, so to speak, with which they are marked. Others, again, are singularly slender in form, but none grow to a large size.

The harmless *common snake*, or *ringed snake*, *Neidr fraith*, *Neidr y tomenydd*, of the antient British, *Natrix torquata* of Gesner and Ray, *Coluber Natrix* of Linnæus, will serve as an example of the form. [NATRIX.]

COLUMBA. [COLUMBIDÆ.]

COLUMBA NO'ACHI (constellation), the dove of Noah, a constellation formed by Halley, close to the hinder feet of Canis Major.

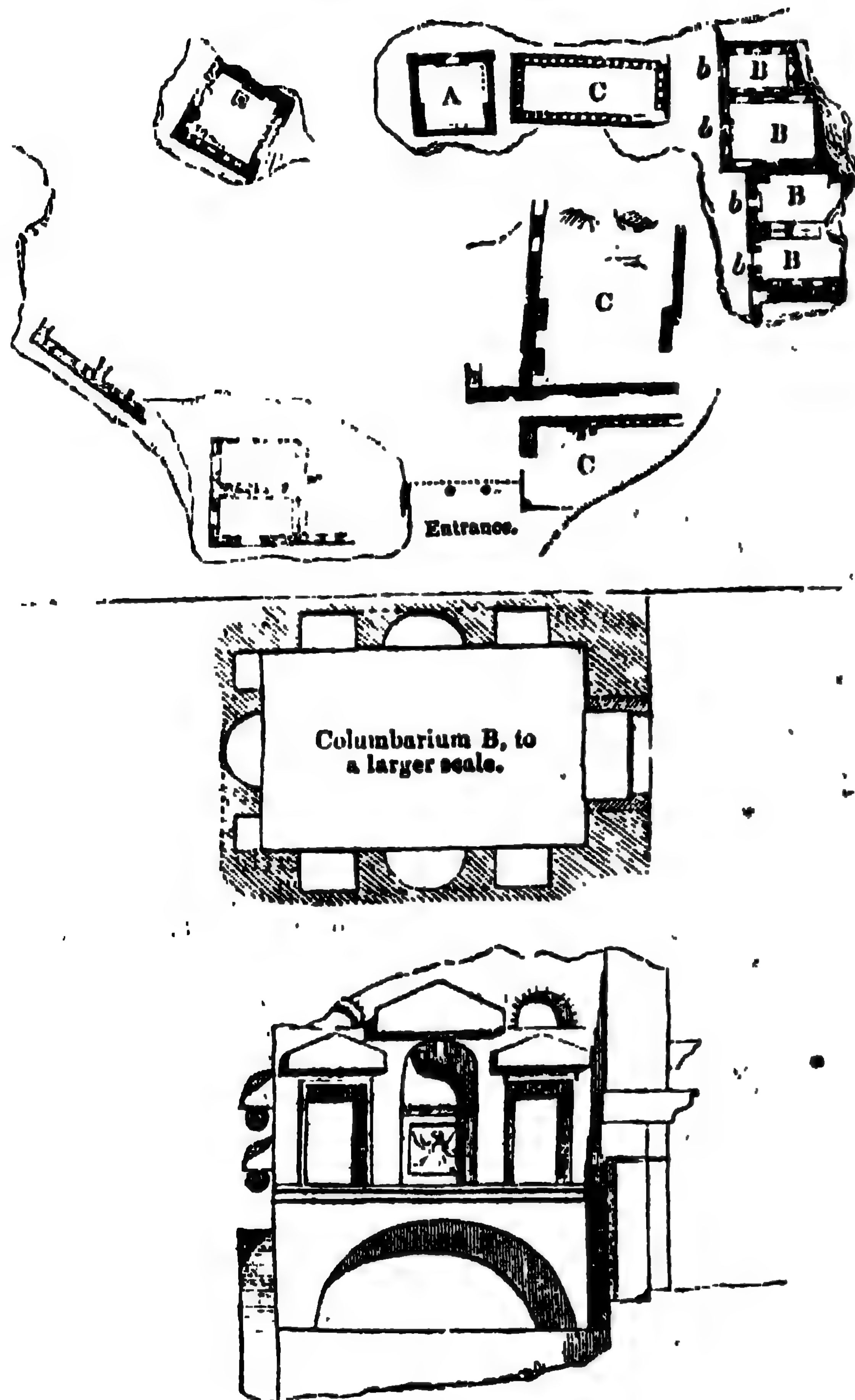
Character.	No. in Catalogue of		Magnitude.
	Piazzi.	Astron. Society.	
θ	9	767	5
	35	622	6
ο	51	630	5
	59	633	6
κ	65	787	4½
ε	140	672	4
	169	689	6
ν^1	177	692	6
ν^2	183	695	6
α	196	699	2
μ	238	712	5
β	267	732	3
γ	297	746	4

COLUMBARIUM, a place of sepulture used for the ashes of the Romans after the custom of burning the dead had been introduced among them. The word columbarium signifies a dovecote; and its application to the Roman places of interment has arisen from the resemblance between the small arched holes which contain the sepulchral urns and the recesses formed for the doves in a dovecote.

This application of the word columbarium is proved by antient inscriptions, but we are not aware that the term is used in this sense by any extant Latin writer.

In the Villa Doria Pamfili at Rome was discovered, some years since, a very extensive columbarium, or rather an assemblage of columbaria, which are shown on the accompanying plan. It was surrounded by a wall, with a triple

[Plan of Columbaria, discovered a few years since in the gardens of the Villa Doria Pamfili at Rome.]



[Section of Columbarium B.]

entrance, formed by two columns. The columbaria, which are on a very diminutive scale, are placed without any regularity. One building, A, superior in workmanship to the others, appears to have been a small temple in antis, built with red bricks, set with very delicate joints, and rubbed on the surfaces. The chambers, B, B, B, &c., were superior columbaria, with large niches, which contained double ollæ or vases for the ashes of the dead, with small tablets let into the wall below each niche. The small structures at C, C, which most resemble the dovecotes, are supposed to have been the sepulchres of the slaves. They are built with reticulated work, and are filled with rows of pigeon-holes, which contain ollæ: they have no inscriptions. The brickwork of these columbaria is of several dates, if we may judge from the diversity of construction. The chambers B *b*, B *b*, have stone doorways, in the Egyptian style. The interior of these little structures, and the temple, have been stuccoed and ornamented with reliefs, and painted. The small room V, in the British Museum (Townley Marbles), represents a columbarium on a large scale: the niches are represented with sculptured and plain tablets. In the immediate neighbourhood of the Columbarium, in the Villa Doria Pamfili, are numerous inscriptions, tablets, and monumental urns, which belonged to these sepulchres, but having been removed from the ollæ, they lose part of their interest. There are several columbaria in the neighbourhood of Rome, among which that of the family Pompeia is remarkable for its tablets, urns, &c., some account of which is given in the *Encyclopédie Méthodique, Architecture*. A sepulchral chamber was discovered in the year 1746 near the gate of San Sebastian at Rome. (See plates to Moses's 'Classical Ornaments, Vases, Candelabra,' &c.)

COLUMBIA, DISTRICT OF, lies on both sides of the Potomac, and is bounded by the State of Maryland on the north-east, north-west, and south-east, and by the State of Virginia on the west and south-west. It forms a square of 100 square miles. That part of it which lies on the south side of the Potomac was ceded by the State of Virginia, and that which is on the north side of the same river, by the State of Maryland, to the United States, July 16, 1790, when it had been determined to establish the seat of the Federal Government on the banks of the Potomac. Washington became the seat of the Federal Government in 1800. The Potomac traverses the district in a south-east direction, and receives within it a small stream called the Eastern Branch. By the junction of this stream with the Potomac a spacious harbour is formed, with sufficient water for the largest vessels. The tides of the Atlantic ascend as far as Georgetown in the district.

The surface of the district is diversified by slight elevations: the soil is rather light and poor. The three towns which it contains are Alexandria on the Virginia side of the river, Washington, the seat of the general government, and Georgetown. The Virginia part, which contains about thirty-six square miles, forms the county of Alexandria, and the Maryland part forms the county of Washington.

This district is immediately and exclusively subject to the Congress of the United States. By Act of Congress, February 27, 1801, the laws of Virginia and Maryland prevail in the parts which were respectively ceded by these States.

Alexandria, Washington, and Georgetown, are under the immediate government of their several corporations, which however, as already stated, are subject to the control of the Congress of the United States. The inhabitants of this district are not represented in Congress. The object in forming this district was to secure the functionaries of the Federal Government from the local jurisdiction of any single state, and all collision with its authorities.

In 1820, the population of the district was 22,615 whites, 4048 free coloured, 6376 slaves, total 33,039: in 1830, the numbers were whites, 27,635; free coloured, 6150; slaves, 6119; total, 39,904. The shipping of the district is about 17,500 tons. The capital, Washington, is in 38° 53′ 30″ N. lat., and about 76° 55′ 30″ W. long. from Greenwich.

COLUMBIA. [CAROLINA, SOUTH.]

COLUMBIA RIVER, is the largest of the American rivers which fall into the Pacific, running probably 200 miles more than the Rio Colorado, whose course is estimated by Humboldt at about 640 miles. Its numerous upper branches rise in the Rocky Mountains, between 42° and 54° N. lat., and are at their source about 650 miles from the Pacific, in a straight line. The principal branch rises in a lake, near 50° N. lat., and runs first in a north-north-western direction along the base of the Rocky Mountains; but in the neighbourhood of Mount Brown (near 52° N. lat.) it suddenly turns to the south, and continues in that direction through more than three degrees of latitude, till it meets another of its great branches, the river Clarke, which also rises in the Rocky Mountains, near 45° N. lat., and traverses more than three degrees of latitude in a north-western direction. At the point of junction the Columbia turns to the west, but by degrees declines again to the south, so that at its junction with the river Lewis or Saptin it has a complete southern course. The river Lewis rises also in the Rocky Mountains, near 42° N. lat., and runs first to the west, then to the north, and towards its mouth again to the west. Though its course is long, it is much inferior in magnitude to the Columbia at their junction, the width of the latter being 960 yards, while that of the Lewis is only 575 yards. Between the mouths of the Clarke River and the Lewis occur the greatest impediments to navigation. Not far below the mouth of the Clarke River are the Kettle Falls, 21 feet high; and above that of the Lewis are other cataracts, where the descent in 1200 yards is 37 feet 8 inches, and where the rapids extend from three

to four miles. The river is here contracted to 45 yards in width. After its junction with the river Lewis, the Columbia still runs upwards of 300 miles, first for a short distance south, and afterwards in general in a western direction. In this part it is from one to three miles wide, embracing a number of islands, some of which are of considerable extent. It empties itself into the Pacific, a little north of 46°, and the tide ascends nearly 180 miles above its mouth. The Indian name of the river is Oregon. It appears, from the most recent information, that the head waters of one branch of the Columbia, of the Colorado, and of the Platte and Yellow Stone, both branches of the Missouri, rise within a few miles of one another. (Lewis and Clarke; *Map of the Society for the Diffusion of Useful Knowledge*.)

COLUM'BIDÆ, pigeon tribe, a natural family of birds, comprising the pigeons, doves, and turtles.

Natural History.—Aristotle mentions five, if not six, birds of this group—Περιστερὰ, Πελειὰς, Φάττα,* Οἰνὰς, and Τρυγὼν, Peristera, Peleias, Phatta, Œnas, and Trugōn—entering at large into their organization and habits. (*Hist.*, book i. c. 1; book ii. c. 15, 17; book iii. c. 1; book v. c. 13; book vi. c. 1, 2, 4, and 8; book viii. c. 3; book ix. c. 7.) He also (book viii. c. 3) speaks of a bird named Φὰψ (Phaps), which Athenæus (Deipn., book ix. c. 11) and others consider to be one of the *Columbidæ*, while others again hold a different opinion, inasmuch as Athenæus states that Aristotle has distinguished five species of pigeons, and enumerates Φὰψ as one, omitting Πελειὰς; and so Aristotle does (book viii. c. 3), but he mentions Πελειὰς elsewhere (book viii. c. 13), and it is clear to us from the context that *Phaps* signified one of the *Columbidæ*, Περιστεροειδεῖς. There is considerable doubt as to which of the species of pigeons Aristotle intended to designate by the terms above given, and some of them have been applied by modern ornithologists to signify forms which he probably never saw. Only two, or at most three, can be identified with anything like certainty. Pliny (*Nat. Hist.*, book x. c. 34) writes de Columbis, and (c. 35) de Palumbibus. He enters, moreover, largely into their habits in other parts of his 'Natural History.'

Much doubt seems to have prevailed as to the proper place of the pigeons in the system. Belon collected the few species known to him under the title Ramiers, Tourterelles, Bisets, Pigeons Fuyards, and Pigeons, among the birds 'qu'on trouve viander indifféremment en tous lieux,' placing them between the Torcou (*Jynx Torquilla*, Wryneck) and the *Merle bleu*, blue thrush. Gesner arranged them between the gallinaceous birds and the bustards; Aldrovandi placed them between the domestic cock and the sparrow; Willughby between the bustards and thrushes, and Ray gave them the same place. Brisson, Pennant, and Latham insulated them in a particular order. Pennant also arranged them between the Gallinaceous and Passerine birds, and Latham between the *Passeres* and the *Gallinæ*. Other authors placed them among the Gallinaceous birds. Linnæus made them a genus of his order Passeres, arranging them between *Tetrao* (the grouse and partridges, &c.) and *Alauda* (the larks). Cuvier placed them among the Gallinaceous birds, next to the Tinamous (*Tinamus*, Latham, *Crypturus*, Illiger), making them the last of the order. In his arrangement, the Echassiers (*Grallatores*, wading birds) form the order which immediately follows the Gallinacés. Lacépède had previously given them the first place in the last-mentioned family, as did also Duméril. Meyer had insulated them as his seventh order, coming between the *Chelidones* (swallow tribe) and his eighth order, *Gallinæ*; and Illiger had found a situation for them under his *Rasores* (the Rasorial birds). Le Vaillant, who seems to have been the first who separated the *Columbidæ* into well-defined divisions, arranged them in three sections; the first containing the *Colombes*, *Ramiers*, and *Tourterelles*; the second, the *Colombars*; and the third, the *Colombi-gallines*. Vieillot made them the last family but one (*Colombins*) of his second tribe (*Anisodactyli*), arranging them between his *Ophiophages* and *Alectrides*. M. Temminck classed them as his ninth order between the *Chelidons* and the *Gallinacés*. De Blainville's order *Sponsores* or *les Colombins* contained these birds, and came between the *Saltatores* (Passeres) and the *Gradatores* (pheasants or partridges): in his amended method, as developed by M. Lherminier, they occupy nearly the same position between the Passeres and the Gallinaceous birds. C. Bonaparte (prince of Musignano) assigns the same place to them. (*Specchio comparativo.*)

When he wrote the article *Pigeon* in the 'Dictionnaire d'Histoire Naturelle,' M. Vieillot conformed to the opinion of Linnæus in placing these birds among the Passeres, because of its natural great analogy to the last-mentioned group, like nearly the whole of which the pigeons pair in the season of love, the male and female working jointly at the nest, taking their turns during incubation, and participating in the care of the young, which, among the true pigeons, are hatched blind, fed in the nest, which they do not quit till they are covered with feathers, and are supported by their parents some time after their departure from it, having no power to feed themselves. Such are the points of resemblance. Their dissimilarity consists in their mode of drinking and feeding their young, in the nature of their plumage, and the singularity of their courtship and of their voice, points of difference which also separate them from the true Gallinaceous birds, with which, says M. Vieillot, they have no analogy in their instincts, their habits, or their loves. Nearly all the Gallinaceous birds are polygamous, and lay a great number of eggs each time they incubate, which is rarely more than once a year in the temperate zones; while the true pigeons lay only two eggs each time, incubate frequently during the year, and are monogamous. Among the Gallinaceous birds, as a general rule, the male does not solace the female at the time of building the nest and of incubation; the young run as soon almost as they are out of the egg-shell, quitting their nest, and seeking their own food immediately. Finally, a striking character removes the pigeons from the Gallinaceous birds, and in M. Vieillot's opinion places them in the same natural group with the Passeres, namely, the possession of a posterior toe articulated at the bottom of the tarsus, upon the same plane as the anterior toes, touching the ground throughout its length in walking and embracing the roost in perching. On the contrary, in the Gallinaceous birds, the hind toe is articulated upon the tarsus higher than the others, and only touches the ground with its claw, or at most with its first phalanx, and remains perpendicular when the bird is on the perch. Nevertheless it must be confessed that there are found among the pigeons, species which participate in some degree with the Gallinaceous birds in regard to their manners and gait (allures) or some exterior conformity. Such are the *Colombi-gallines*, the *Pigeon-caille* of le Vaillant, to which must be added the *Colombi-gallines* of M. Temminck, the *Mountain partridge* of Sloane, the *blue-headed pigeon*, the *Cocotzin*, &c., all which have their feet more elongated than those of their congeners, with the wings of the partridges, that is to say rounded, and with the two first quills shorter than the third or fourth; but for the rest, all, with the exception of the *Colombe-galline* of le Vaillant, approach the other pigeons in their amours, their laying, and the bringing up of their young; and so it is of the birds which at Guadaloupe and Martinique bear the name of partridge; and M. Vieillot quotes Dutertre, who says that 'according to the common opinion of the inhabitants of Guadaloupe, there are three sorts of partridges, red, black, and grey, which have never passed in my mind for aught but turtles (tourterelles); for they have not the short quality of flesh belonging to our partridges, they have the straight bill, they perch and build their nests in trees, they only lay two eggs,' &c. (*Hist. des Antilles*, tom. ii.) These facts, adds M. Vieillot, have been confirmed to me by the inhabitants of Martinique and Guadaloupe. Of all the pigeons and turtles, continues this ornithologist, which I have had occasion to study in the living state, the Cocotzins are those which appear to me to have the greatest relation to the partridges: their haunt is always in the fields and savannahs; there they seek their food, and never resort to trees; they raise themselves into the air like the partridges, and after a short flight alight upon the ground. For this reason the English and the inhabitants of the United States call it the *Ground Dove*. But the habit of frequenting the ground, &c. does not belong exclusively to the pigeons whose wings are formed as above stated, for, according to Latham, the *Columba Chalcoptera* (Phaps), which M. Temminck arranges with his *Columbæ* (Vieillot's first section), has the same habits, so that the English of New Holland call it the *Ground Pigeon*. (Vieillot.)

'The family of Columbidæ (Mr. Vigors, *Linn. Trans.*,

* Belon says that the modern Greeks call it Phassa

vol. xiv. p. 410) alternately arranged by systematic writers among the *perching* and *gallinaceous* orders, and not unfrequently grouped as a separate order between the two, at once indicates where the point of junction exists between them. These birds, although we have the high authority of Linnæus for uniting them with that division of our *perchers* which forms his *Passeres*, I do not hesitate in arranging, conformably to the opinion of M.M. Cuvier and Illiger, as a subdivision of the *gallinaceous birds*.

'In those particulars, where they respectively assume the character of each order, their affinity with the latter is considerably stronger than that which approximates them to the former. Their food and habits, their internal economy, and the formation of their bills, identify them with the *Rasores;* while, on the other hand, the characters which bring them near the *Insessores*, their divided toes and comparatively short legs, are weakened by the resemblance which those members bear to the same parts of the contiguous order in their general structure, and more particularly in the bluntness of the nails, so strongly indicative of the rasorial habits of the *Gallinaceous* tribes, and so strikingly contrasted with the sharpness of the nails in the Linnæan *Passeres*. They are much more nearly allied to those latter tribes by their habits of perching and building their nests in trees or rocks, by the absence of the spur on the legs of the male, and by the inferior number of their tail-feathers.'

In a note to that part of the text which alludes to the rasorial habits of the *Gallinaceous* birds, the author cites the habits of *Columba Nicobarica, Columba carunculata*, and *Columba passerina*. Mr. Vigors accordingly places the *Columbidæ* in the aberrant group of his *Rasores*. 'I have already observed, when speaking of the affinities,' says that ornithologist in the paper above quoted, 'which connect the orders of birds together, that the Columbidæ form the passage from the *Insessores* to the *Rasores* by their habits of perching and their powers of flight. The hind-toe is articulated, as in the *Perchers*, and their *tarsi* are shorter, more particularly in the earlier groups, than those of the *Gallinaceous Birds* in general. The first group which we meet in this extensive family is the genus *Vinago* of M. Cuvier, the bills of which, stronger and more solid than they are usually found to be among the pigeons, unite them to *Penelope* and *Crax*, which form the opposite extreme of the present order, as well as to *Musophaga* and *Corythaix*, which approach, as we have seen, the whole of the groups before us, and connect them with the *Perchers*. From this genus *Vinago*, which seems confined to the southern divisions of the Old World, we may observe a series of groups leading gradually to the true *Columba*, of which genus the European species *Columba Œnas*, Linn., may be considered to form the type. Hence we are led by several intervening species to the *Columbi-Gallines* of M. Le Vaillant, which, still retaining the soft and flexible bill of *Columba*, approach the typical Gallinaceous birds in their more elevated *tarsi*, and in their habits of living in company and seeking their nourishment chiefly on the ground. Among these may be noticed some forms, *C. Nicobarica*, Linn., and *C. carunculata*, Temm., for instance, which possess the feathered appendages, together with the naked face and caruncles of the Linnæan *Gallinæ;* and another group, the *Lophyrus* of M. Vieillot, which exhibits the size and general form of the same birds, as well as the singular plumes which frequently decorate their head. This last-mentioned genus, formed of the crowned pigeon of India, possessing the strongly-formed leg and foot of *Meleagris*, Linn., but without the spurs, while at the same time it retains the bill of *Columba*, may be observed to open the passage immediately from the present to the succeeding family' (the Phasianidæ). Read 3rd December, 1823.

In 1825 Mr. Swainson wrote as follows upon this interesting family:—'The extensive genus of *Columba*, like that of *Falco*, has been pronounced *indivisible* by an eminent ornithologist of the present day; who, from having made these birds his peculiar study, is in one sense pre-eminently qualified to give a decided opinion. The principle he has laid down, and on which this opinion consequently is founded, is, that whenever intermediate species are discovered which serve to unite two neighbouring genera, such genera should invariably be united.' After stating that this theory has been refuted in the pages of the 'Zoological Journal,' Mr. Swainson thus continues: 'It is admitted that there are certain peculiarities of form and of economy among the *Columbidæ*, which point out natural divisions. Some of these have been used for the construction of genera, by MM. le Vaillant, Vieillot, and Cuvier, and of sections by M. Temminck; but the immense number of species already known, and the great influx of new ones, renders it essential that many others should be formed. As we labour under a comparative ignorance of the natural economy of the vast number of tropical species recently described, any attempt to throw the *Columbidæ* into their natural arrangement must be very imperfect. The basis of such a work must rest on their natural habits, their food, and their geographic distribution. Yet, as we see in other natural families that a peculiarity of economy is almost invariably accompanied by some corresponding modification of structure, we shall receive considerable assistance by accurately examining such variations. We may note the forms, without being acquainted with their reference to the peculiar habits of the group; and although our inference in some cases may be erroneous, in others we shall not be far from the truth. The passenger-pigeons, for instance, have their first quill-feather as long as any of the others—a sure indication of that rapid and long-continued power of flight they are known to possess. The *Columbi-Gallines* of M. Le Vaillant are described as having naked and somewhat lengthened tarsi; a structure well adapted to those ambulating habits which bring some of them close to the *Phasianacæ*, Vigors, and others to the *Cracidæ*, Vigors. Another group, the *Colombars* of M. le Vaillant (*Vinago*, Cuv., *Tréron*, Vieill.), have a strong hard bill; and their short clasping tarsi covered with feathers lead us to conclude they seldom perch upon the ground; in fact, MM. le Vaillant and Cuvier both assert that these birds are only found in the tropical forests of the Old World. Apparently confined to the same regions, we see another group, wherein the bill partakes of that weak structure observed in the generality of pigeons, while the tarsi are thickly clothed with feathers, similar to the group last mentioned. These seem to be the principal divisions among the *Columbidæ*. Minor distinctions may be founded on the relative strength and structure of the quill feathers, which in some are very peculiar, and, as being connected with the powers of locomotion, deserve our attention. Some writers have attached more importance to the form of the tail, and have therefore divided the *Columbidæ* into two great divisions, separating such species as have this organ rounded or lengthened from those in which the tail is short and even. This plan, however it may help to discover a *species*, is obviously artificial, and totally inadequate to give us any ideas on natural groups. The tail in fact is but an accessory help to the wings, and therefore deserves an inferior consideration, although its form may be usefully employed in sectional divisions. Among the characters which may perhaps guide us in distinguishing inferior groups or at least sections, may be noticed the naked orbits so conspicuous in several exotic species. The ground doves of the New World show a peculiar character in having the sides of their tarsi margined by a row of minute feathers, which often conceal the knees. Their first quill feather is also very broad, and almost as long as any of the others; if these characters hold good in more instances than those I have quoted, we shall be justified in using them in a generic sense, by separating these birds from the *Columbi-gallines* of M. le Vaillant. Allied to the ground doves in manners, but greatly distinguished from them in the structure of their feet, is the bronze-winged pigeon of Australasia (*Columba chalcoptera*, Lath.). In this the front scales of the tarsi (unlike any other species I have yet seen) are formed of two series, while those of the sides are reticulated and very minute; the hind toe (or hallux) is also remarkably short, and clearly evinces an approximation to the more perfect *Gallinaceæ*.' Mr. Swainson then defines his genus *Ptilinopus**. In 1827 the same author characterized the genera *Peristera, Chæmepelia*†, and *Ectopistes*‡; and in the *Fauna Boreali-Americana* §, under *Columba Ectopistes migratoria*, he has the following note: 'As ornithologists do not appear to be aware of the great difference which exists in the groups of this family in the relative structure of their feet, we shall here draw their attention to the principal groups. In the even-tailed wood pigeons of Europe, North America, and the Old World,

* 'Zoological Journal,' vol. i. p. 470, *et seq.*
† So printed, but Chamæpelia must be meant.
‡ Zoological Journal, vol. iii p. 360.
§ Part II., the Birds, 1831.

forming the restricted genus *Columba*, the external and internal anterior toes are equal. In the lovely genus *Ptilinopus*, Swainson, confined to the green pigeons of the Indian and Australian isles, and in that of *Vinago*, Cuv., formed by the thick-billed species of the same countries, the inner toe is much *shorter* than the outer; but in the sub-genus (?) *Ectopistes*, Swainson, and the small turtle doves, this proportion is reversed, the *inner* toe being the longest. In the beautiful genus *Peristera*, Swainson, which comprises all the bronze-winged pigeons of Australia and the ground pigeons of America, the tarsi are more elevated, the hind toe shorter, and the inner toe is likewise the longest. We have been for some time engaged in analyzing this family, with the view of ascertaining the relative value of all these groups.' Dr. Ritgen (1828) makes the genus *Columba*, Linn., form the third family (*Herpochoroptení*) of his first tribe (*Choroptení*) of his second series (*Xerornithes*, or birds of the dry land) in his trichotomous system, as applied to birds.

P. J. Selby, Esq., in the 'Naturalist's Library' (1835), characterizes the following genera, *Carpophaga*, *Phaps*, and *Geophilus*. He thus speaks of the classification: 'Of the sub-families or five typical forms of the *Columbidæ*, we can only speak with diffidence and uncertainty, as no analysis of the species sufficiently strict or extensive has hitherto been instituted, from whence conclusive deductions can be drawn. We shall only cursorily observe, that the arboreal pigeons, embracing *Vinago*, Swainson's genus *Ptilinopus*, our genus *Carpophaga*, and some other undefined groups, with feet formed expressly for perching and grasping, and through which, from their habits and form, the necessary connexion with the insessorial order is supported, are likely to constitute one; the true pigeons, of which our ring pigeon and common pigeon may be considered typical, a second; the turtles and their allies, with feet of different proportions from the preceding, and graduated tails, a third; the ground pigeons, or *Columbi-gallines* of the French naturalists, a fourth; and the fifth is not unlikely to be represented by Vieillot's genus *Lophyrus*, in which the deviation from the proper Columbine form is not to that of the typical *Rasores*, but to the *Cracidæ*, placed at the farther extremity, and, like the *Columbidæ*, another aberrant family of the Rasorial order *.'

Organization.—One part of the internal organization of the pigeon is worthy of special notice. The crop in the state which is adapted for ordinary digestion is thin and membranous, and the internal surface is smooth; but by the time the young are about to be hatched, the whole, except that part which lies on the trachea, becomes thicker and puts on a glandular appearance, having its internal surface very irregular. In this organ it is that the food is elaborated by the parents before it is conveyed to the young; for a milky fluid of a greyish colour is secreted and poured into the crop among the grain or seeds undergoing digestion, and a quality of food suited to the nestling is thus produced. The fluid coagulates with acids and forms curd, and the apparatus forms, among the birds, the nearest approach to the mammæ of the warm-blooded animals †: hence no doubt the term pigeon's milk. The number of vertebræ amounts to 13 cervical, 7 dorsal, 13 sacral, and 7 caudal = 40 (Cuvier). The sternum is narrow with a deep keel, the inferior border convex, and the anterior one curved forwards, thin and trenchant; the manubrial process is strong and bifurcated, the costal processes short. The posterior margin is cleft by two fissures on either side of the mesial plane, the lateral and superior fissures being the deepest; the mesial ones are occasionally converted into a foramen. The costal surface of the lateral margin is, as in the gallinaceous birds, of very little extent. In the crown pigeon the superior fissures are so deep and wide as to convert the rest of the lateral margin into a mere flattened process, which is dilated at the extremity. (Owen.)

Geographical Distribution.—Very extensive, the form occurring almost everywhere, except within the frigid zones. Species most abundant in Southern Asia and the Great Indian Archipelago.

Columbidæ.

Bill moderate, compressed, covered at the base of the upper mandible with a soft skin, in which the nostrils are pierced, and more or less curved at the point. Feet with three divided toes in front, and one behind.

Genera. Vinago (Cuvier).

Bill comparatively large, strong, thick, and solid, compressed at the sides; the tip very hard, hooked, and inflated; the nostrils comparatively exposed, and with the swollen or projecting membrane but little developed. Tarsi short, partly clothed with feathers below the tarsal joint; sole wide, the membrane being extended, and the whole foot formed for perching and grasping; the outer toe longer than the inner, claws strong, sharp, and semicircular, 'closely resembling in form those of the woodpecker or other Scansorial birds' (Selby). Wings of mean length, strong and pointed, second and third quills about equal and the longest in the wing. Mr. Selby says, that in all the species submitted to examination, the third quill has the central part of the inner web deeply notched, as if a piece had been cut out; and that the prevailing colours are green and yellow of different intensities, contrasted more or less in certain parts with rich purple and reddish brown.

Geographical Distribution.—Intertropical Asia* and Africa.

Food.—Berries and fruits.

Habits.—The genus is shy and timid, and inhabits the woods. Mr. Selby gives the following on the authority of Mr. Neill, who, speaking of *Vinago sphenura*, says, 'I had two, but both I believe were males. Both had a *song*, very different from the mere cooing of the ringdove. When they sang in concert they gave the same little tune, but on different keys. After the death of one the survivor used to sing at command, or, at all events, when incited to it by beginning its tune.†'

Example.—*Vinago aromatica*, *Columba aromatica*, Latham. 'The Aromatic Vinago is of a mild and timorous disposition, and is generally seen in flocks or societies, except during the period of reproduction, when they pair, and retire to the recesses of the forest. The nest is simple, and composed of a few twigs loosely put together, and the eggs are two. . . . The base or softer part of the bill is a blackish-grey, the tip yellowish-white, strong, much hooked, and bulging on the side. The forehead is of a bright siskin green, the crown greenish-grey, the chin and throat gamboge-yellow, the remainder of the neck, the breast, belly, lower back and rump, yellowish-green. The upper back or mantle, and a part of the lesser wing coverts, are of a rich brownish red, and exhibit a purplish tinge in certain lights. The greater wing-coverts and secondary quills are greenish-black, with a deep and well-defined edging of gamboge-yellow throughout their length. The tail has the two middle feathers wholly green, and slightly exceeding the rest in length; these are of a dark bluish-grey, with a



[Vinago aromatica.]

* 'Naturalist's Library,' Ornithology, vol. v. p. 85, *et seq*

† See Hunter, 'Animal Economy,' p. 235. Owen, article Aves, 'Encyclopædia of Anatomy and Physiology,' p. 318; and Birds, vol. iv. p. 427.

* 'Naturalist's Library,' Ornithology, vol. v. p. 96.

† Mr. Gould has figured Vinago Sphenura, N.S., from the Himalaya mountains, in his beautiful 'Century of Birds.'

dark central band. The under tail-coverts are yellowish-white, barred with green. The legs and toes are red, the claws pale grey, strong, sharp, and semicircular.' (Selby, and see Temminck.)

Locality.—The continent of India, Java, and other adjacent islands.

Habits.—Arboreal. Mr. Selby, in the interesting work above quoted, gives the following note which accompanied the skins of *Vinago militaris*, and *Vinago aromatica*. 'Green Pigeon.—This beautiful bird has brilliant red eyes. Its feet are something like the parrot's, and it climbs in the same way as that bird. It is very difficult to find; for although a flock is marked into a tree, yet its colour is so similar to the leaf of the banyan (on the small red fig of which it feeds), that if a bird does not move you may look for many minutes before you can see one, although there may be fifty in the tree.'

Ptilinopus (Swainson.)

Wings moderate, first quill contracted towards the apex, third and fourth longest. Bill slender. Tarsi feathered.

Mr. Swainson says that in proposing the characters of this genus, he wishes them to be considered more as indicating a group, by which the genus *Trêron*, Viell., (*Vinago*, Cuv.), may be united to the naked-legged pigeons, than as being so rigidly framed as to exclude all other species which do not strictly present the same structure. 'It is quite evident,' continues Mr. Swainson, 'from consulting the excellent figures of MM. le Vaillant and Temminck, that there are a number of pigeons found both in India and Australasia, which have the feathered tarsi of *Trêron*, accompanied by the slender bill of the other *Columbidæ*, and thereby clearly indicate an intervening group: yet among these birds there is a material difference in the construction of their quill feathers. In the *Columba magnifica*, for instance, the first quill is equal in breadth to any of the others, and thus assimilates, probably, to that structure which belongs to *Trêron* (I say probably, because I have not, at this moment, the means of ascertaining the fact. Mr. Vigors is in possession of several specimens of this group, which he assures me have no peculiarity in the shape of the first quill feather), while in the bird we are about to describe, this quill is suddenly narrowed, and resembles the blade of an obtuse pen-knife. This singular formation, however, I have detected in several of the naked-legged pigeons, such as the *Col. striata*, Lath., and the *Col. humeralis* of Temminck, two birds from Australasia in the Linnæan Society's collection; and likewise in two other species from Brazil now before me. This character, therefore, will not be peculiar to *Ptilinopus*; but when coupled with the feathered tarsi and slender bill, may indicate a group to which the *Col. Monacha* of Temminck, and the *Colombe porphyre*, most probably belong. The *Columba magnifica* may thus form the type of a subordinate section, more closely approaching to *Trêron*; while the narrow quill-feather of *Ptilinopus* may serve to conduct us to the naked-legged pigeons *. In the first volume of 'The Natural History and Classification of Birds †,' the same author says, 'Sometimes one half or more of some of the quills are (is) of the usual breadth, while their terminating end is suddenly contracted and obtusely pointed: this formation is seen in some few species of the exotic pigeons belonging to the genus *Peristera* and *Ptilinopus*. It cannot, however, as some have imagined, be taken as a subgeneric character, because perhaps the next species in the series has it not; and it is probably only a sexual distinction.' (p. 96.) Mr. Selby, in 'The Naturalist's Library ‡,' feels inclined to still further subdivide the group, restricting the genuine title of *Ptilinopus* to that group of smaller pigeons in which the first quill feather becomes suddenly narrowed or attenuated towards the tip, and the tarsi are feathered almost to the division of the toes.

Habits and Food.—*Geographical distribution* of the restricted genus.—The Moluccas, the Celebes, and the islands of the Pacific (Selby.) Habits retired; in forest solitudes. Food, fruits and berries.

Description of the restricted genus.—Bill comparatively slender, the base slightly depressed, and the soft covering of the nostrils not much arched or swollen; the tip, though hard, is little inflated, with a gentle curvature; the forehead is rather low and depressed; the legs are short but strong; the tarsi clothed with feathers nearly to the division of the toes; the feet are calculated for grasping, and are similar in form to those of *Vinago*, the sides of the toes being enlarged by the extension of the lateral membrane, and the outer longer than the inner one; the wings are strong and of moderate length, the first quill feather considerably shorter than the second, and suddenly narrowed towards the tip, a peculiarity also possessed by several pigeons belonging to other distinct groups, and by which means the connexion is thus kept up between them. The third and fourth quills are nearly equal to each other, and are the longest in the wing. The tail is of proportionate length, and generally square at the end. Predominating colour like that of *Vinago*, green, varied in parts with yellow and orange, and in some, beautifully encircled with masses of purplish red and vivid blue. (Selby.)

Example.—*Ptilinopus cyano-virens*, *Columba cyanovirens* of Lesson, who described it in the 'Voyage de la Coquille.' The bird is termed *Manasope* in the Papuan tongue, and inhabits, says Lesson, the profound and still virgin forests (encore vierges) of New Guinea. It was in the neighbourhood of the harbour of Doréry that we procured the greatest number of individuals. Their low cooing was heard frequently from the large trees, and every thing indicated that they were common.

Description.—Total length from the end of the bill to the extremity of the tail, eight inches six lines (French); bill delicate and black; iris of a red brown; tarsi short, and nearly entirely feathered; toes with a membranous border, and of a lively orange colour; head, rump, upper part of the body, wings and tail, of an agreeable grass-green; a large patch (calotte) of a beautiful indigo blue covers the occiput; elongated blue spots occupy the centre of the subalar feathers, which are bordered with a straight yellow line; the internal and hidden part of the same feathers is brown; the quills are entirely brown, and bordered at the external edge with a line of canary yellow; the tail is square and rectilinear; the feathers which compose it are fourteen in number, brown, their extremities white below, and of a green similar to that of the back above, passing into black in the middle, and each terminating within with a white spot; the two exterior ones are brown, bordered with yellow externally, as are the two or three next; the shaft is brown; the throat to half-way down the neck is ash-grey; the breast is greyish-green; the belly and the flanks are at first green mingled with some yellow borderings, and then comes a large patch of yellowish-white extending on each side so as to form a kind of girdle; the feathers of the thighs are green; those of the vent, white and pale yellow; the lower tail coverts are yellow mingled with green. M. Lesson mentions another individual rather smaller, with some differences of plumage, which he supposes to have been either a female or a young one. Mr. Selby remarks upon the fact that no notice is taken of the form of the first quill feather in this description, and regrets it, but entertains little or no doubt of its presence in nearly a similar form to that assumed by the rest of this group, of which *Ptilinopus purpuratus* is the type. *Locality*, New Guinea.



[Ptilinopus cyano-virens.]

* 'Zoological Journal,' vol. i. p. 473. † 'Cabinet Cyclopædia,' 1836.
‡ 'Ornithology,' vol. v. p. 100.

Carpophaga (Selby).

'In this group,' says Mr. Selby, 'which is composed of birds of a much larger size than the preceding, the wings, though possessing the same relative proportions, have no emargination, or sudden narrowing of the tip of the first quill. Their tarsi also are not so thickly or entirely feathered; and their nostrils are placed nearer to the base of the bill. In some species, green, yellow, and purple are the prevailing colours; in others, a rich bronzed or metallic colour composes the upper plumage, exhibiting shades of deep green and purple, according to the light in which it is viewed, while in those which lead the way to the typical pigeons, the tints become less vivid and more uniform in their distribution. Their bill is considerably depressed at the base, the membrane in which the nostrils are placed but little prominent or swollen, the tip compressed and moderately arched, the tomia slightly sinuated. The forehead is low, and the feathers advance considerably upon the soft portion of the bill. In many of them a caruncle, or gristly knob, varying in size and shape according to the species, grows upon the basal part of the upper mandible during the season of propagation. This is supposed to be common to both sexes, as the female is described with it in Duperrey's 'Voyage.' After this epoch it is rapidly absorbed, and its situation scarcely to be observed upon the surface of the bill. The feet are powerful, and formed for grasping, the soles being flat and greatly extended. As in the other members of this group, the hind toe is fully developed and long, and the exterior longer than the inner toe. They inhabit the forests of India, the Moluccas, Celebes, Australia, and the Pacific Isles. Their food consists of fruits and berries. That of the precious nutmeg, or rather its soft covering, known to us by the name of mace, at certain seasons affords a favourable repast to some species, and upon this luxurious diet they become so loaded with fat as frequently, when shot, to burst asunder when they fall to the ground. And here we may remark on the remarkable provision Nature has made for the propagation as well as the dissemination of this valuable spice, for the nutmeg itself, which is generally swallowed with the whole of its pulpy covering, passes uninjured through the digestive organs of the bird, and is thus dispersed throughout the group of the Moluccas and other islands of the east. Indeed, from repeated experiments, it appears that an artificial preparation analogous to that which it undergoes in its passage through the bird, is necessary to ensure the growth and fertility of the nut; and it was not till after many unsuccessful attempts had been made that a lixivium of lime, in which the nuts were steeped for a certain time, was found to have the wished-for effect, and to induce the germinating tendency. The fruit of the Banyan (*Ficus religiosus* (religiosa), the sacred tree of the Hindoos, is also a favourite repast of all the pigeons of this group, as well as o the stronger-billed *Vinago*.'

Example.—Carpophaga oceanica, Columba oceanica, Lesson. This species, according to Lesson, is the *Moulouesse*, or *mouleur*, of the natives of Oualan, and though it approaches the Nutmeg Pigeon, *Columba* (*Carpophaga*) *ænea* very nearly, it differs from it in size, being one third less, and in the distribution of some of its colours. 'The Nutmeg Pigeon lives more particularly in the eastern Moluccas, and especially at New Guinea and Waigiou, while the Oceanic Fruit-Pigeon is abundant in the little isle of Oualan, in the midst of the great archipelago of the Carolines, and seems to exist in the Pelew Islands, where Wilson mentions it under the name of *cyep*.' Lesson further observes, that it may be possibly spread over the Philippines, and at Magindanao.

Description.—Total length, fourteen inches (French), including the tail, which measures five; the bill, an inch long, is black, strong, and surmounted at its base by a rounded and very black caruncle; the feet are very strong and of a bright orange colour; the tarsi are feathered nearly down to the toes, which have a well-developed border; the wings are pointed, and only one inch shorter than the tail, which is almost rec[illegible]. The feathers of the forehead, cheeks and throat, are [illegible] with grey; the head and the back of the neck are of a deep slaty grey; the back, rump, wing-coverts, quills, and tail feathers, are of a uniform metallic green, passing into brown on the interior of the great feathers; the breast and upper part of the belly are grey, with a tint of rust colour; the lower part of the belly, the vent, the thighs, and the lower tail-coverts, are a deep ferruginous red; the tail-feathers on the under side are a bright reddish green (vert rougeâtre clair.) (Lesson).

M. Lesson thinks that this, very probably, is the species mentioned by 'the celebrated naturalist, Forster (and not Captain Forster, as the reading is, twice, in M. Temminck's work, tom. i. p. 89, 8vo), who observed in the Isle of Tanna, one of the New Hebrides (Cook's 'Second Voyage,' vol. iii. p. 179, 4to), a Nutmeg Pigeon of the same species as that which occurred at the Friendly Islands.'

The caruncle shown in the cut is dissipated after the breeding season, leaving nothing but a slight cutaneous wrinkle. M. Lesson says that the bird feeds on a berry which is very abundant in the small Isle of Oualan, and that it is not disturbed by the natives.



[Carpophaga oceanica.]

M. Selby gives as a form apparently belonging to this division of the *Columbidæ*, the following species: *Columba Phasianella* (Temm.), the structure of the bill being, as he observes, intermediate between that of *Vinago* and *Columba*, and the feet formed upon the same plan as those of the rest of the *Ptilinopinæ*.

Description.—Length from fourteen to sixteen inches, the tail being seven, and rather more. Wings short, reaching, when closed, about an inch and a half beyond the root of the tail, rounded, and with the third quill longest; the first and fourth being equal to each other. Bill, measuring from the forehead nearly three quarters of an inch long; the tip of the upper mandible moderately arched, and with a notch; that of the lower angulated and strong. Throat, yellowish white. Head, sides, and front of the neck, and whole of the under plumage, orange-brown. Hinder part of neck changeable rich violet-purple, with brilliant gold reflections. Back, wing-coverts, and the rest of the upper plumage, deep reddish-brown, shot with bronze in some lights. Tail graduated or cuneiform, the two middle feathers brown, the lateral marked obliquely with a black bar. Feet and naked part of legs reddish brown. Sole of the hind and inner toes much expanded.

Young differing from the adult in having the neck dirty reddish brown, with narrow bars of black; belly of a pale reddish-grey, minutely and darkly speckled; back inclining to hair-brown; and smaller wing-coverts deeply edged with orange-brown.

M. Temminck first described the species in the 'Linnean Transactions,' from an Australian specimen. It has since been observed in most of the Philippine and Molucca Islands, Java, &c.

Columba Phasianella is an inhabitant of the woods. Its food is said to consist of a kind of pimento and of other aromatic berries, swallowed entire. The flesh is dark, but its flavour is stated to be excellent.

Mr. Selby makes the group to contain *Columba Macroura*, Auct., *Col. nuchalis*, Wagler, and *Col. Reinwardtii*, Temm. 'Of its precise situation,' says Mr. Selby, 'in the circle of the *Columbidæ*, we speak with some degree of



[Columba Phasianella.]

doubt, not having had an opportunity of instituting so strict an analysis of the species as the subject requires; but we believe it will be found to enter among the *Ptilinopinæ* or arboreal pigeons, as the feet and tarsi of its members are similar in form to those of that division, the latter being very short and partly plumed below the joint, the former with the exterior toe longer than the inner, and the hinder toe fully developed; the sole of the foot, by the extension of the membrane, is broad and expansive, and the claws are arched and strong, all of which are characters evidently showing these members to be expressly adapted for perching and prehension, and not for gressorial movements. The bill also in one species (*Col. Reinwardtii*) approaches in point of strength near to that of *Vinago*, and in all of them the tip of both mandibles is hard and firm, the upper one with a visible emargination and moderately arched. Their habits and mode of life are also nearly allied to the other arboreal species, being the constant inhabitants of the woods, and subsisting upon the fruits and berries of various trees and shrubs. M. Temminck, in his description of this species, says that it possesses a structure and form precisely similar to that of the *Columba migratoria* of North America. To this we cannot subscribe, seeing that its essential characters, as above described, are different, and that the only point of resemblance consists in the length of the tail. Indeed, so far removed do we think it from the American group, that we cannot consider it as its analogue in the Asiatic regions where it resides.'

COLUMBA. Auct.

Most ornithologists are agreed that the sub-family *Columbina* contains the type of the form of the *Columbidæ*, and that we are to look among the species of our own country for that type. The ring pigeon, Cushat or Queest (*Columba Palumbus*), the wood pigeon (*Columba Œnas*), and the rock pigeon or biset (*Columba livia*), are considered to be the forms in which the peculiarity of structure and habits of the family are most perfectly developed, and of these *Columba Palumbus* is generally taken as the typical point of comparison. The Columbinæ are distinguished by a bill of moderate strength, with a hard tip, bulging and somewhat arched. The nostrils are partly clothed by a soft membrane, and the orbits of the eyes are more or less denuded of feathers. The feet may be called both gressorial and insessorial; for they are so organized, that the action of walking or perching may be performed at pleasure, for the back toe is moderately long, and the claws are so formed and placed as not to interfere with terrestrial progression, while they are at the same time calculated for arboreal prehension. In the types the exterior and interior toes are of equal length. The wings are fully developed and somewhat pointed; the second and third quills are the longest. The tail is generally square, and moderately long.

'In those species,' says Mr. Selby in the work above quoted, 'which are the media of connexion with other groups, the above characters become partially modified, as we see exemplified in the species nearest allied to the *Ptilinopinæ*, or arboreal pigeons, their feet losing the true character of that of the common pigeon, and assuming more of the grasping form than that fitted for progress upon the ground.'

The species are very numerous, and spread over every quarter of the globe.

'The prevailing colour of the pigeons is bluish-gray, of various intensities and shades, frequently embellished upon the neck with feathers having a metallic lustre and peculiar form, and which exhibit various tints of colour according to the light in which they are viewed. They are naturally birds of a wild and timid disposition (though one species has been partly reclaimed), and usually live congregated in extensive flocks, except during the season of reproduction, when they pair. Most of the species seek their food upon the ground. This consists of the different cerealia, as also acorns, beech-mast, and other seeds, and occasionally of the green and tender leaves of particular plants. Their flesh is sapid and nutritious, being of a warm and invigorating nature. Their flight is powerful, very rapid, and can be long sustained, and many species are in the habit of making distant periodical migrations. They are widely disseminated, species of the genus being found in every quarter of the globe, and in all climates, except the frozen regions of the two hemispheres. They build in trees or holes of rocks, making a shallow nest of small twigs loosely put together. Their eggs are never more than two in number, their colour a pure white; they are incubated alternately by both sexes, and are hatched after being sat upon from eighteen to twenty-one days. The young, upon exclusion, are thinly covered with down, which is rapidly succeeded by the proper feathers.' (Selby.) The apparatus for preparing the food for the nestlings has been before adverted to.

Examples.—Columba spadicea. Mr. Selby places this species as connecting the arboreal species with the typical pigeons, but arranges it under the *Columbinæ* not without doubt, 'for although it presents characters in some of its members approaching those of the pigeons, it cannot be denied that, in its general appearance, and the metallic lustre of its plumage, it also shows evident marks of a near affinity to several species of the genus Carpophaga, and it might perhaps with equal propriety be placed at the extremity of that group;' and regrets the little information extant of its peculiar habits and mode of life, which would have assisted in forming a more satisfactory conclusion as to its proper position. He adds, that from the form and size of the feet we may judge that its habits are more those of an arboreal than terrestrial bird, though its claws want the great curvature of those of the *Ptilinopinæ*, and show its capability of occasionally resorting to the ground for food. M. Lesson, who killed many individuals of this brilliant pigeon, described by Latham and figured by Temminck, says that its flesh is excellent, and that it is very abundant in the woods about the bay of Ipiripi, or the Bay of Islands. The first which he procured was killed and sent to the expedition by one of the officers of the Coquille, and Toui, chief of the hippah of Kaouera, near which she was moored, brought them frequently on board. He adds, that the individual described by Latham as the chestnut-shouldered pigeon came from Norfolk Island, not far from New Zealand, and that M. Temminck indicates the Friendly or Tonga Islands as its native country. This locality, M. Lesson, from whom the following description is taken, seems to doubt.

Total length 16½ inches (French). English authors give it as from 19 to 20; tail 6 inches, nearly rectilineal, and slightly notched; bill rather swollen near the point of the lower mandible, of a brilliant carmine at its base as well as the feet, the tarsi of which are feathered almost to the toes. The eyes are surrounded with a bright-red membrane, and the iris is of the same colour. All the upper parts of the bird, the back, the rump, the wings, and the throat, are of a changeable hue, in which are mingled rosy-copper reflections, running into brilliant and iridescent tints, becoming more sombre upon the great quills. The plumage of the

breast, belly, vent, and tarsi, are pure white. The upper part of the tail is brown, slightly tinged with greenish; and below it is brown, which is deepest within and at the extremity.



[Columba spadicea.]

Columba dilopha. 'In this curious species,' says Mr. Selby, 'besides the occipital crest, an ornament which is found in many other birds, there is an additional one in front, composed of long recurved and lax feathers, which not only occupy the forehead, but also the superior part of the soft or basal portion of the bill. This double crest gives the head of the pigeon a character unlike any of its congeners, and more resembling that of some of the crested *Phasianidæ* or *Cracidæ*, with which an analogical relation is thus sustained. In other respects its characters agree with those of *Col. spadicea*, the proportion of the wings and the form of the feet being nearly the same. Temminck, who first described it, observes 'cette nouvelle espèce a le plus de rapports dans toutes ses formes avec la *Columba spadicea*, et toutes les deux sont tres peu différentes de notre Ramier d'Europe.' In the concluding observation we cannot concur to the extent implied by that eminent naturalist; for, although an approach from the fruit-eating pigeons, or Carpophagæ, to the true pigeons, is made by *Col. spadicea* and *dilopha*, still the form of their feet, evidently better adapted for arboreal than terrene habits, and their general aspect, are such as to show that some intermediate form is wanting to bring them into that immediate connexion with the group represented by the European ring pigeon, which M. Temminck seems to intimate.'

Description.—Size nearly that of *Col. spadicea*. Wings long and powerful, reaching when closed beyond the middle of the tail, second, third, and fourth feathers longest, and nearly equal, fifth shorter than the first. Bill rich orange, tip of under mandible obliquely truncated, tip of upper mandible compressed, somewhat arched, culmen rounded. Frontal crest beginning on the upper part of the bill immediately behind the horny tip, and above the nostrils, composed of long curved feathers, soft and loose in texture, and bluish grey tinged with rufous in colour, pointing backwards. Occipital crest rich rufous, bounded on each side from the posterior angle of the eye by a streak of glossy black, decumbent, composed also of long soft feathers with open barbules, each feather widening towards the tip. Side and front of neck and breast pale-grey, black at the base of the feathers, which is hid. The feathers here are trifid at the end: on the back of the neck they are acuminated, but not distinctly divided as upon the breast. Back, scapulars, and wing-coverts deep bluish-grey, the feathers darker at the margin; quills and secondaries bluish-black; under plumage grey. Tail square, basal part and narrow band pale-grey tinged with reddish, tip and broad intermediate bar black; length seven inches. Naked parts of tarsi and toes crimson-red; hind toe strong, with a broad flat sole, and exceeding the tarsus in length; nails long and somewhat curved. *Locality*, New Holland and Java.



[Columba dilopha.]

Passing the *Columba Palumbus* (*Ramier* of the French, *Torquato*, *Ghiandaria*, &c., of the Italians, according to Belon; *Colombaccio*, *Palombo*, *Piccione da Ghianda* of the same, according to Prince Bonaparte; *Ringdufva* of the Fauna Suecica, *Wildtaube*, and *Ringel-Taube* of the Germans, *Ring-dove*, *Queest*, and *Cushat* of the British, *Ysguthan* of the antient British, and, in Belon's opinion, the Φάττα of the Greeks), and the *Columba Œnas*, (*Palombella*, *Palombella di macchia*, *Piccione torracchio* of the Italians, *Le Pigeon Sauvage* of Brisson, *Stock-Dove* and *Wood-Pigeon* of the British) we come to the *Columba livia*; but, before we enter upon the history of the last-named species, we must observe that the *Cushat* most probably sat for the pretty picture of Virgil's 'aëriæ palumbes,' and that it is considered the type of the Columbinæ. Instances have been known of its laying in aviaries, and Mr. Selby states that he has been informed 'that a pair of ring pigeons, in one of the aviaries of the Zoological Gardens, this last year built their nest in a tree or shrub contained within it, and that the female laid two eggs, which unfortunately were destroyed by some accident during incubation. This fact shows that, under favourable circumstances, and when the habits of the bird are attended to, a progeny may be obtained.' Of *Columba Œnas* Mr. Selby observes, 'Near as it approaches the common pigeon in size and form, no mixed breed that we are aware of has ever been obtained between them, although repeated attempts to effect an intercourse have been made. This in our mind appears a strong and convincing proof, that all the varieties, generally known by the name of Fancy Pigeons, have originated from one and the same stock, and not from crosses with other species, as some have supposed, the produce of which, even could it be occasionally obtained, we have no doubt would prove to be barren, or what are generally termed mules.'

Columba livia. This, the *Pigeon privé** of Bélon, *Le Pigeon domestique* and *Le Biset* and *Le Rocheraye* of Brisson, *Coulon*, *Colombe*, *Pigeon* of the French, *Palombella*, *Piccione di torre*, *Piccione di rocca* of the Italians, *Feldtaube*, *Haustaube*, *Hohltaube*, *Blau Taube*, and *Holtz Taube* of the Germans, *Wild Rock Pigeon* of the British, *Colommen* of the antient British, is the stock from which ornithologists generally now agree the domestic pigeon and its varieties are derived. 'Under this species,' writes Mr.

* Belon is of opinion that this is the Περιστερὰ of the Greeks. He seems to have the domesticated race in view, while his Πελειὰς, Livia Columba, Palumbus minor, Livia, Palumbella, Biset, Croiseau, would seem to be the wild rock-pigeon.

Selby, 'we include not only the common pigeon, or inhabitant of the dove-cot, but all those numerous varieties, or, as they are frequently termed, races of domesticated pigeons, so highly prized, and fostered with such care and attention by the amateur breeder or pigeon fancier; for, however diversified their forms, colour, or peculiarity of habit may be, we consider them all as having originated from a few accidental varieties of the common pigeon, and not from any cross of that bird with other species, no signs or marks whatever of such being apparent in any of the numerous varieties known to us. In fact, the greater part of them owe their existence to the interference and the art of man; for by separating from the parent stock such accidental varieties as have occasionally occurred, by subjecting these to captivity and domestication, and by assorting them and pairing them together, as fancy or caprice suggested, he has at intervals generated all the various races and peculiar varieties which, it is well known, when once produced, may be perpetuated for an indefinite period, by being kept separate from, and unmixed with, others; or what by those interested in such pursuits is usually termed 'breeding in and in.' Such also, we may add, is the opinion of the most eminent naturalists as to their origin, and it is strongly insisted on by M. Temminck in his valuable work, the 'Histoire Générale Naturelle des Pigeons.' Indeed the fact that all the varieties, however much they may differ in colour, size, or other particulars, if permitted, breed freely and indiscriminately with each other, and produce a progeny equally prolific, is another and a convincing proof of their common and self-same origin; for it is one of those universal laws of nature, extending even to plants, and one which, if once set aside or not enforced, would plunge all animated matter into indescribable confusion, that the offspring produced by the intercourse of different, that is, distinct species, is incapable of further increase. That such an intercourse may be effected is well known to all; but it is generally under peculiar or artificial circumstances, and rarely when the animals, birds, or whatever they may be, are in their natural state, and in a condition to make their own election. It is seen in the crosses obtained in a state of confinement between the canary and goldfinch, linnet, &c.; in the hybrids between different species of *Anatidæ*, when domesticated or kept in captivity; in the cross between the pheasant and common fowl, &c.***

'The bastard produce of the common wild turtle (*Turtur communis*) with the turtle of the aviary (*Turtur risorius*) has been proved by frequent experiment to be barren, although the two species from whence it originates appear to be closely allied, and a mixed breed is easily procured; and such, we have no hesitation in saying, would be the event, if a cross could be obtained between the common pigeon and the ring pigeon, the wood pigeon, or any other species.'* These observations are well worthy of attention. The assertion respecting the bastard produce of the turtles, made above, is corroborated by MM. Boitard and Corbié in their History of the Pigeons de Voliere, and the principle is further confirmed by the experiments of Mauduyt, Vieillot, and Corbié.

The varieties of this bird, produced under the fostering hand of man, the tumblers, croppers, jacobines, runts, spots, turbits, owls, nuns, &c. &c., would fill a volume. Our limits will not permit us to figure or describe them. The *carrier* however demands notice. In one of his odes (εἰς περιστερὰν) Anacreon has immortalized it as the bearer of epistles. Taurosthenes sent to his expectant father, who resided in Ægina, the glad tidings of his success in the Olympic games on the very day of his victory. Pliny (*Nat. Hist.*, book x., 37,) speaks of the communication kept up between Hirtius and Decimus Brutus at the siege of Mutina (Modena); 'what availed Antony the trench and the watch of the besiegers; what availed the nets (retia) stretched across the river, while the messenger was cleaving the air (per cœlum eunte nuntio).' The crusaders employed them, and Joinville records an instance during the crusade of Saint Louis. Tasso, (Gierusalemme Liberata, cant. xviii.) sings of one that was attacked by a falcon and defended by Godfrey,

'Che dal collo ad un filo auinta pendo
Rinchiusa carta, e sotto un' ala ascosa.'

which 'carta' Godfrey of course reads, and is put in possession of all the secrets. In the same way Ariosto (cant. xv.) makes the 'Castellan di Damiata' spread the news of Orrilo's death all over Egypt. Sir John Maundeville, knight, warrior, and pilgrim, who penetrated to the border of China in the reigns of our Second and Third Edward, thus writes: 'In that contree and other contrees bezonde, thei han a custom, whan thei schulle usen werre, and whan men holden sege abouten cytee or castelle, and thei withinnen dur not senden out messagers with lettere, fro lord to lord, for to aske sokour, thei maken here letters and bynden them to the nekke of a *Colver*, and letten the *Colver* flee · and the *Colveren* ben so taughte, that thei fleen with the letters to the very place, that men wolde sende hem to. For the *Colveres* ben norysscht in tho places, where thei ben sent to; and thei senden hem thus for to beren here letters. And the *Colveres* retournen azen, where as thei ben norisscht and so they don comounly.'

The carrier however gradually sank, in this country at least, to the bearer of the intelligence of the felon's death at Tyburn—Hogarth's print will occur to every body: it became the messenger from the race-course and prize-ring, and is now said to be largely used in stock-jobbing transactions. Every day we read remonstrances on this subject, and accounts of some of the hapless messengers being shot; nay, the fostering of a breed of falcons has been threatened, to oppose their progress to our shores. Some idea of the astonishing fecundity of the domesticated pigeon may be derived from the assertion of Biberg, who observes that if you suppose two pigeons to hatch nine times a year, they may produce in four years 14,760 young.*

In its wild state the rock pigeon is widely distributed; the rocky islands of Africa and Asia, and in the Mediterranean, abound with them. Virgil's beautiful simile in the Fifth Æneid evidently relates to this species:—

'Cui domus et dulces latebroso in pumice nidi.'

In the Orkneys and Hebrides it is said to swarm. 'It is also met with upon the northern and western coasts of Sutherland, the perforated and cavernous rocks which gird the eastern side of Loch Eriboll, and those of the limestone district of Durness, furnishing suitable places of retreat; and again upon the eastern coasts of Scotland it is seen about the rocky steeps of the Isle of Bass and the bold promontory of St. Abb's Head.' (Selby.)†

Description of *Columba livia* in its wild state:—Bill blackish brown; the nostril membrane red, sprinkled, as it were, with a white powder. The irides pale reddish orange. Head and throat bluish grey. Sides of the neck and upper part of the breast dark lavender purple, glossed with shades of green and purplish red. Lower part of



[Columba livia.]

* Naturalist's Library, Ornithology, vol. v., p. 152. A work, of which the letter-press and figures improve with every volume.

* Biberg says 14,672; but Stillingfleet (*Tracts*, p. 90, 3d ed.) says that the numbers ought to be as above, or the expression should be altered, as Biberg includes the first pair.

† We are informed that at Somerset House, London, pigeons have made their nests about the building, both on the side towards the water and inland, for the last sixty years. The birds that so make their nests are said to be the blue ones. Were these originally wild birds, or have they returned to something like their wild habits from the domesticated state? Most probably they had been domesticated.

breast and abdomen bluish grey. Upper mandible and wing-coverts blue grey. Greater coverts and secondaries barred with black, so that there are two broad and distinct bars across the closed wings. Lower part of the back white; rump and tail-coverts blueish grey. Tail deep grey, with a broad black bar at the end. Legs and feet pale purplish red. Wings when closed reaching within half an inch of the end of the tail. (Selby).

Ectopistinæ (Selby).

Turtur.

Bill more slender than that of the pigeons. Tip of the upper mandible gently deflected, that of the lower scarcely exhibiting the appearance of an angle. Tarsi rather shorter than the middle toe. Feet formed for walking or perching; inner toe longer than the outer. Front of tarsi covered with broad imbricated scales. Wings, first quill a little shorter than the second, third longest of all. Tail rounded or slightly graduated. (Selby).

Example.—Turtur risorius, Columba risoria, Auct; *Turtur torquatus Senegalensis*, Brisson; *Tourterelle à collier*, Buffon; probably the turtle of the Scriptures, and still plentiful in Egypt and other eastern countries, where it is often kept in confinement. The relics of Greek and Roman art give a very fair representation of this species; but Belon and others seem to be of opinion that the *Turtur communis*, common turtle-dove, was the *τρύγων* of the Greeks.

Description of a wild specimen from Southern Africa. Length about ten inches. Chin whitish; from the corners of the mouth to the eyes a narrow streak of black. Forehead pale bluish-grey; crown darker; cheeks, neck, breast, and belly grey, tinged with vinaceous or pale purplish-red; the hind neck with a demi-collar of black; some of the side feathers of the collar tipped with white. Back, scapulars, and rump, pale clove brown, with a greenish tinge. Margins of wings, greater coverts, and under wing-coverts blue grey. Greater quills hair brown, delicately edged with greyish-white. Vent and under tail-coverts white. Legs and feet grey; inner toe a little longer than the outer. (Selby).

Habits and Food.—In its natural state it haunts the woods, where it breeds, making a nest like that of the common turtle, and lays two white eggs. It seeks its food in the open grounds, and subsists upon grain, grass seeds, and pulse, &c. Its trivial name is derived from a fanciful resemblance to the human laugh in its cooings. (Selby).



[Turtur risorius.]

Hybrids.

A race between the common turtle and this species has been obtained; but the mules are stated to have been invariably barren.

Mr. Selby provisionally places the *Columba lophotes* of Temminck under this genus.

Ectopistes (Swainson).

Bill slender, notched. Wings rather elongated, pointed; the first and third quill equal; the second longest. Tail rounded, or curvated. Feet short, naked; anterior scales of the tarsi imbricate; lateral scales very small, reticulate. Types:—*Col. speciosa*, Temm.; *Col. migratoria*, Linn. (Swainson).

Example.—Ectopistes migratoria, Columba migratoria, Auct. The *Passenger Pigeon*, Wilson, Audubon, and others. Our limits not allowing us to give a detailed history of any length of the habits of more than one species, we have selected Wilson's graphic account of this elegant bird as the most striking.

'The roosting-places are always in the woods, and sometimes occupy a large extent of forest. When they have frequented one of those places for some time, the appearance it exhibits is surprising. The ground is covered to the depth of several inches with their dung; all the tender grass and underwood destroyed; the surface strewed with large limbs of trees, broken down by the weight of the birds collecting one above another; and the trees themselves, for thousands of acres, killed as completely as if girdled with an axe. The marks of their desolation remain for many years on the spot; and numerous places could be pointed out where, for several years after, scarcely a single vegetable made its appearance. When these roosts are first discovered, the inhabitants, from considerable distances, visit them in the night with guns, clubs, long poles, pots of sulphur, and various other engines of destruction. In a few hours they fill many sacks, and load horses with them. By the Indians, a pigeon-roost or breeding-place is considered an important source of national profit and dependence for that season, and all their active ingenuity is exercised on the occasion. The breeding-place differs from the former in its greater extent. In the western countries, viz., the states of Ohio, Kentucky, and Indiana, these are generally in back woods, and often extend in nearly a straight line across the country for a great way. Not far from Shelbyville, in the state of Kentucky, about five years ago, there was one of these breeding-places, which stretched through the woods in nearly a north and south direction, was several miles in breadth, and was said to be upwards of forty miles in extent. In this tract almost every tree was furnished with nests wherever the branches could accommodate them. The pigeons made their first appearance there about the 10th of April, and left it altogether with their young before the 25th of May. As soon as the young were fully grown, and before they left the nests, numerous parties of the inhabitants, from all parts of the adjacent country, came with waggons, axes, beds, cooking utensils, many of them accompanied by the greater part of their families, and encamped for several days at this immense nursery. Several of them informed me that the noise was so great as to terrify their horses, and that it was difficult for one person to hear another speak without bawling in his ear. The ground was strewed with broken limbs of trees, eggs, and young squab pigeons, which had been precipitated from above, and on which herds of hogs were fattening. Hawks, buzzards, and eagles were sailing about in great numbers, and seizing the squabs from the nests at pleasure, while, from twenty feet upwards to the top of the trees, the view through the woods presented a perpetual tumult of crowding and fluttering multitudes of pigeons, their wings roaring like thunder, mingled with the frequent crash of falling timber; for now the axemen were at work, cutting down those trees that seemed to be most crowded with nests, and contrived to fell them in such a manner, that in their descent they might bring down several others; by which means, the falling of one large tree sometimes produced 200 squabs, little inferior in size to the old ones, and almost one heap of fat. On some single trees, upwards of 100 nests were found, each containing one squab only; a circumstance in the history of this bird not generally known to naturalists. It was dangerous to walk under these flying and fluttering millions, from the frequent fall of large branches, broken down by the weight of the multitudes above, and which, in their descent, often destroyed numbers of the birds themselves; while the clothes of those engaged in traversing the woods were completely covered with the excrements of the pigeons.

'These circumstances were related to me by many of the most respectable part of the community in that quarter, and were confirmed in part by what I myself witnessed. I passed for several miles through this same breeding-place, where every tree was spotted with nests, the remains of those above described. In many instances I counted upwards of ninety nests on a single tree; but the pigeons had

abandoned this place for another, sixty or eighty miles off, towards Green River, where they were said at that time to be equally numerous. From the great numbers that were constantly passing over our heads to or from that quarter, I had no doubt of the truth of this statement. The mast had been chiefly consumed in Kentucky; and the pigeons, every morning a little before sunrise, set out for the Indiana territory, the nearest part of which was about sixty miles distant. Many of these returned before ten o'clock, and the great body generally appeared on their return a little after noon. I had left the public road to visit the remains of the breeding-place near Shelbyville, and was traversing the woods with my gun, on my way to Frankfort, when, about ten o'clock, the pigeons which I had observed flying the greater part of the morning northerly, began to return in such immense numbers as I never before had witnessed. Coming to an opening by the side of a creek called the Benson, where I had a more uninterrupted view, I was astonished at their appearance: they were flying with great steadiness and rapidity, at a height beyond gun-shot, in several strata deep, and so close together that, could shot have reached them, one discharge could not have failed of bringing down several individuals. From right to left, as far as the eye could reach, the breadth of this vast procession extended, seeming every where equally crowded. Curious to determine how long this appearance would continue, I took out my watch to note the time, and sat down to observe them. It was then half-past one; I sat for more than an hour, but instead of a diminution of this prodigious procession, it seemed rather to increase, both in numbers and rapidity; and, anxious to reach Frankfort before night, I rose and went on. About four o'clock in the afternoon, I crossed Kentucky river, at the town of Frankfort, at which time the living torrent above my head seemed as numerous and as extensive as ever. Long after this I observed them in large bodies that continued to pass for six or eight minutes, and these again were followed by other detached bodies, all moving in the same south-east direction, till after six o'clock in the evening. The great breadth of front which this mighty multitude preserved would seem to intimate a corresponding breadth of their breeding-place, which, by several gentlemen who had lately passed through part of it, was stated to me at several miles.'

Wilson then enters into a rough calculation of the numbers of this mass, and he comes to the conclusion that its whole length was 240 miles, and that the numbers composing it amounted to 2,230,272,000 pigeons, observing that this is probably far below the actual amount. He adds, that allowing each pigeon to consume half a pint of food daily, the whole quantity would equal 17,424,000 bushels daily. Mr. Audubon confirms Wilson in every point, excepting that he very properly corrects that part of the narrative which would lead to the conclusion that a single young one only is hatched each time. The latter observes that the bird lays *two* eggs of a pure white, and that each brood generally consists of a male and female.

Description.—Wings long and acuminate, having the second quill feather exceeding the others in length. The tail is greatly cuneiform or graduated, and consists of twelve tapering feathers. Bill black, and like that of the turtle. Legs purplish-red, short, and strong. Iris bright orange-red, the naked orbit purplish-red. Head and cheeks pale bluish-grey. Fore-neck, breast, and sides brownish-red, with a purplish tinge. Abdomen and vent white. Lower part and sides of neck purplish-crimson, reflecting tints of emerald green and gold. Upper plumage deep bluish-grey, some of the scapulars and wing-coverts spotted with black. Greater coverts grey, tipped with white. Quills blackish-grey, their exterior webs bluish-grey. Tail with the two middle feathers black, the other five on each side grey at the base, with a black bar on the interior arch, and passing into white towards the extremities.

The female is rather smaller, and has the colours of her plumage much duller than those of the male, though the distribution is the same. (Selby.) *Locality*, North American Continent, between the twentieth and sixty-second degrees of north latitude. Mr. Eyton has figured one as a visitant to our shores, on the authority of Dr. Fleming, who, in his 'History of British Animals,' says that one was shot in the parish of Monymeal, Fifeshire, on the 31st December, 1825.

Mr. Selby refers provisionally *Columba Capensis*, Auct., *Columba Macquarrii*, Lesson, and *Columba venusta*, Temm. to his group of *Ectopistinæ*, and thinks that by these and some other nearly allied forms, a passage to the next group, *Peristerinæ*, the ground doves, is effected.



[Ectopistes migratoria.]

Peristerinæ (Selby).

Distinguished from the preceding groups by their terrene habits, and their evident approach in many points to the more typical Rasores or Gallinaceous birds. In these the bill is rather slender, frequently subemarginate, and the tip of the upper mandible but gently deflected; the wings are generally short and rounded, and in many instances concave, as in the partridge, grouse, &c. The legs are considerably longer than in the typical pigeons; the tarsus usually exceeding the middle toe in length, and the feet better adapted for walking than grasping; the claws are obtuse and slightly arched. The hallux is shorter, and its relative position different from that of the arboreal species. Their plumage is plainer and more uniform in tint than that of some of the preceding groups, though it is still brilliant in those species which connect them with other forms. They live almost entirely upon the ground, and many of the species run with great celerity, on which account they have been called partridge pigeons. Their flight, which is usually low, is effected with greater exertion than that of the pigeons, and is never long sustained. (Selby.)

Mr. Selby observes that this division contains a great number of species, and is of opinion that when better investigated, it will be found divisible into a variety of minor groups or genera. He places under it Phaps, Chamæpelia, and Peristera. This group is distinguished by a longer bill, very faintly emarginate, and by its tarsi, which are moderately long and naked, with the frontal scales divided into two series, and the sides and hinder part reticulated with minute scales. Another group, he adds, seems indicated by certain Asiatic species, conspicuous for the rich metallic green of the plumage of their backs, resembling therein some of the *Ptilinopinæ*. The tarsi of these are destitute of scales, except a few indistinct ones in front, just above the toes. The bill is rather long, and destitute of a notch. They live mostly on the ground, but their flight is powerful. Mr. Selby takes *Columba superciliosa* of Wagler as the type of this last-mentioned group.

Phaps (Selby).

Bill moderately long, rather slender; upper mandible gently deflected at the tip, and with the indication of a notch or emargination. Wings of mean length; second and third feathers longest, and nearly equal. Tail slightly rounded. Legs, tarsi as long as the middle toe, the front covered with a double row of scales, sides and back reticulated with small hexagonal scales. Hind toe short; inner toe exceeding the outer in length. Claws blunt, slightly arched. Type, *Columba chalcoptera*, Latham; *Columba elegans*, Temm.; and *Columba picata*, Wagler, belong to this group. (Selby.)

Example.—*Phaps chalcoptera*, *Columba chalcoptera*, Latham; *Columba Lumachelle*, Temm.; bronze-winged ground dove.

Size about that of *Columba Œnas*. Total length, about fifteen inches. Bill, from edges of the gape, hardly an inch; black anteriorly; reddish near the base. Forehead,

stripe below the eyes, and throat white; crown brown, tinged with reddish, filleted with dusky red; cheeks and sides of neck bluish-grey; bottom of neck in front and breast purplish-grey. Belly and vent grey, with a pale purple tinge. Back, scapulars, rump, and upper tail-coverts brown tinged with greenish in some lights, the border of each feather paler. Wing-covers bluish-grey, but the outer webs of every feather have a large ovate spot, producing various tints of metallic brilliancy according to the direction of the light. Quills brown above, with the inner surface of the webs, the axillary feathers, and under wing-coverts bordered rather deeply with pale orange-red. Tail slightly rounded, bluish-grey, with a black band. Legs red; two rows of scales in front, the sides reticulated.

Locality and Habits.—Australia and islands in the Pacific. In the neighbourhood of Sydney, from September till February.

Haunts dry and sandy places, where it is generally seen on the ground, and occasionally perched upon the low branches of shrubs. *Nest* inartificial, in holes of low trees or decayed trunks near the ground; sometimes on it. *Eggs* two, white. These birds go in pairs generally· their cooing is loud, and has been compared, when heard at a distance, to the lowing of a cow.



[Phaps chalcoptera.]

Chamæpelia* (Swainson)

Bill slender, entire. Wings rounded, the first quill short; third, fourth, and fifth nearly equal and longest, the webs on both sides slightly emarginate. Tail rounded. Feet rather short, the sides of the tarsi feathered. Types, *Columbæ passerina*, Linn.; *squamosa*, Temm. (Swainson).

Example.—*Chamæpelia Talpicoti, Columba Talpicoti*, Temm., the species which Mr. Selby considers to be the type. Length six inches and a quarter, adult male; forehead, crown, and nape of neck ash-grey; cheeks and throat pinkish-white; upper plumage entirely brownish-orange, with the exception of a few transverse streaks of black upon the exterior webs of some of the wing-coverts nearest the body; under plumage deep vinaceous red; axillary feathers and part of under wing-coverts black; tail with the two middle feathers brownish-orange, the remainder brownish-black, with reddish-brown tips, moderately curved; bill and orbits bluish-grey; legs and toes pale-red, the outer side of the tarsus with a row of small feathers down the line of junction between the acrotarsia and paratarsia; quills broad, the fourth with a large projecting notch towards the middle of the inner web. The female has the crown of the head of a sordid grey; the upper plumage of a wood-brown, tinged with red; the scapular and wing-coverts marked as on the male; under plumage dirty-grey, tinged with pale purplish-red. (Selby.)

* Printed generally Chamepelia. The derivation we take to be χαμαὶ and πέλεια, 'ground-dove.'

Locality and Habits.—Brazil, Paraguay, and other districts of South America. Haunts open grounds near woods, where it roosts and breeds upon the underwood, but never far from the ground, where it is active, and feeds upon the smaller cerealia, berries, &c. Generally observed in pairs, sometimes in families of four or six, never in large flocks. Does not fly from the face of man, but affects the confines of houses and farm-yards. Easily kept and propagated in aviaries.



[Chamæpelia Talpicoti.]

Peristera (Swainson).

Bill slender, sub-emarginate. Wings rounded, the first quill short and abruptly attenuated, second and fifth equal, third and fourth equal and longest. Tail rounded. Feet strong, naked, somewhat lengthened; anterior scales of the tarsi imbricate, lateral scales none. Type, *Columba cinerea*, Temm. (Swainson).

Example.—*Peristera tympanistria, Columba tympanistria*, Temm. Length about nine inches; upper plumage brown, slightly tinged with grey on the neck; large spots of shining dark-green on the outer webs of three or four of the greater wing-coverts; middle tail-feathers brown; the two exterior on each side grey, with a broad black bar near the tip; inner webs of greater quills deep brown: forehead, streak over the eye, and under plumage pure white; under wing-coverts and sides pale orange-brown; under tail-coverts brown; bill and legs grey, the latter with a reddish tinge.

Locality.—South Africa, where it is said to haunt woods. The species does not seem to be common.



[Peristera tympanistria.]

Geophilus (Selby).

Mr. Selby, speaking of *Columba cyanocephala*, Wagler, *Turtur Jamaicensis*, Brisson; *Columba caruncu1ata*, Wag-

ler; and *Columba Nicobarica*, Latham, *Columba Gallus*, Wägler, says, 'Whether they will form a separate division, or the three first will enter among the Peristerinæ, and the Lophyrus alone remain a representative of another group, we are unable to determine, not possessing sufficient materials to institute so strict an analysis as is necessary, or to trace out with precision the direct affinities of those species, and the situation they hold in respect to the other groups of the *Columbidæ*, as well as those of the adjoining families. The three first we have provisionally included in the genus *Geophilus*. In their form and habits they approach still nearer to the typical Gallinaceous birds than the species we have just been describing. Their tarsi are long, and covered with hexagonal scales; their tail short, and rather pendent; their wings concave, short, and rounded; and their body, as compared with the typical pigeons, thick and heavy. A striking departure from the general economy of the Columbidæ is further observed in their mode of propagation, the number of the eggs they lay each hatching not being confined to two, as is seen to prevail in the groups already described, but extending to eight or ten, which are incubated upon the ground, and the young, like those of the true Gallinaceous birds, are produced from the egg in such a state as to be able immediately to follow the parent, which broods over and attends them like the partridge or domestic fowl. They live entirely upon the ground, except during the hours of repose, when they sometimes retire to bushes, or the low branches of trees. They walk and run with great quickness, like the *Gallinæ*, and in fact appear to be the forms which immediately connect this family with the Pavonidæ and Tetraonidæ. Although for the present we have placed the first three under the same generic head, yet from their distinct geographical distribution, and the difference observed in the bill of the first, it is more than probable that a further division will be required.'

Geophilus caruncululatus, *Columba carunculata*, Temm.; *Colombe Galline*, Le Vaill. Size about that of the Common Turtle, but with the body stouter and more rounded. Base of the bill and forehead covered with a naked red wattle; another wattle of the same hue depends from the chin, and branches of it extend upwards towards the ears. Plumage of head, cheeks, neck, and breast purplish-grey; back, scapulars, and wing-coverts pale grey; feathers bordered with white. Belly, upper and under tail-coverts, flanks, and under wing-coverts white. Tail short, rounded, deep ruddy-brown, except the outer feather on each side: these have the outer web white. Legs covered with hexagonal scales, purplish-red. Iris with a double circle, yellow and red. The female has no wattle, and her colours are less pure. (Le Vaillant.)

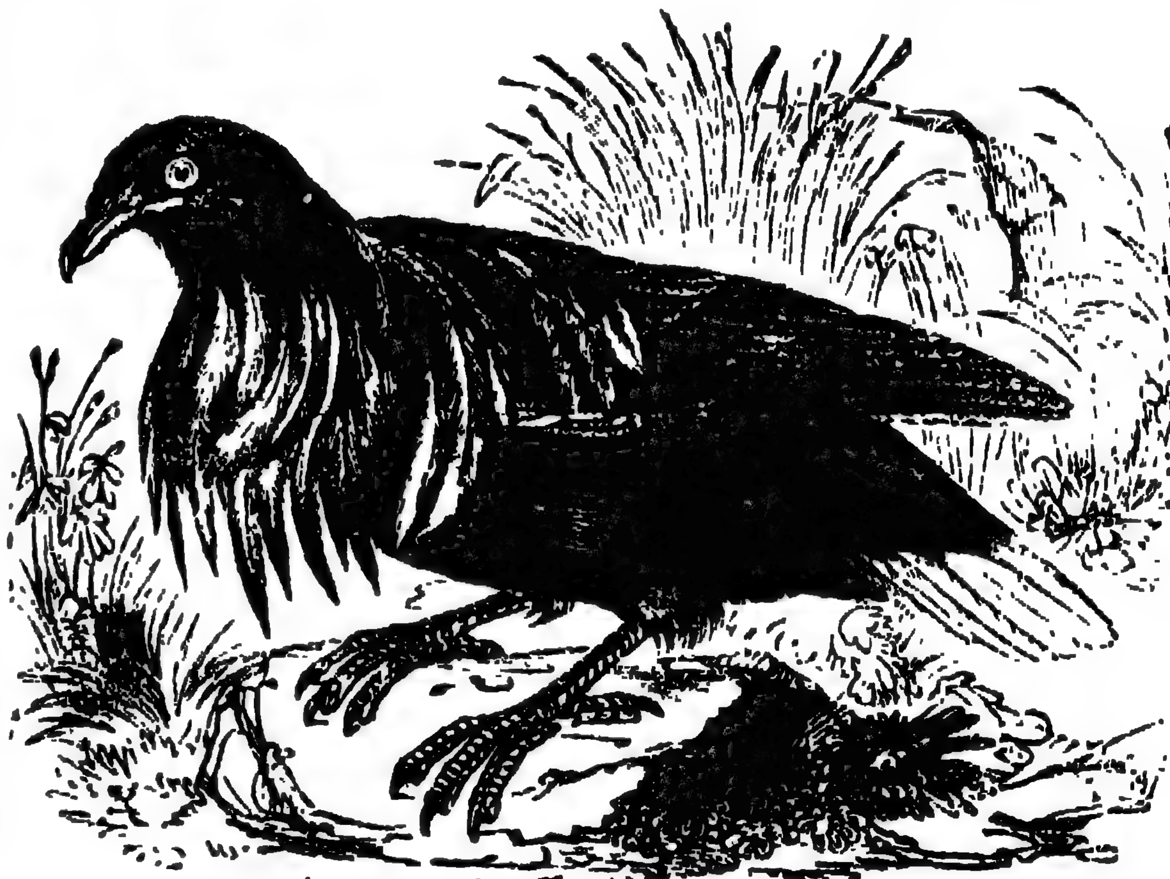


[Geophilus caruncalatus.]

Locality and Habits.—South Africa, where it was discovered in the Great Namaqua country by Le Vaillant, who gives the following account of its habits and affinities:—'To the pigeons its affinity is shown by the form of the bill and the plumage; while it differs from them in the pendent wattle, elongated tarsi, rounder body, less graceful form, tail, which it carries hanging down like that of a partridge, and rounded wings, points which bring it near to the *Gallinæ*.' A passage is thus formed by it, in his opinion, between those birds and the pigeons. The nest, composed of twigs and the dried stems of grasses, is formed in some slight hollow of the ground, and there the female lays six or eight reddish-white eggs, which are incubated by both the parents. The young are hatched clothed with down of a reddish-grey, run immediately and follow their parents, which keep them together by a peculiar oft-repeated cry, and brood over them with their wings. Their first food consists of the larvæ of ants, dead insects, and worms, which the parents point out to them. When strong enough to find their own food, they live on grain of different sorts, berries, insects, &c., and keep together in coveys like the partridge and other Tetraonidæ till the pairing-time.

If the wattles of the last-named species recall to the observer the same parts so highly developed in the Gallinaceous birds, the species which we next present will remind him of the hackles which ornament the Gallinæ.

Geophilus? Nicobaricus, *Columba Nicobarica*, Latham: *Columba Gallus*, Wägler. Length hardly fifteen inches; bill slender, about 1¼ inch long, tip but little bent downwards; the tail pure white, the quills deep blackish-blue, with varying tints of green; all the rest of the plumage rich metallic green, shooting, according to the light, into the variegated tints of golden green, bronze, bright copper colour, and deep purplish-red; neck-feathers long, narrow, and pointed, like those of the domestic cock: barbules towards the tip silky and distinct; tail short, pendent, nearly square; wings, when closed, reaching nearly to the termination of tail; legs strong, moderately long, black, covered with hexagonal scales; nails yellow, gently curved, blunt. Upon the base of the upper mandible of the male a round fleshy tubercle (probably apparent in the breeding season only). The female resembles the male in colour, but her neck-feathers are not so long, and she has no tubercle.



[Geophilus Nicobaricus.]

Locality and Habits.—The isles of Nicobar, Java, Sumatra, and many of the Moluccas. Authors differ about its habits, some asserting that its nest is placed on the ground, and that the female lays several eggs, the young running as soon as hatched; but Mr. Bennet, who saw them in Mr. Beale's aviary at Macao, says that they were usually seen perched upon the trees, even upon the loftiest branches, and adds, that they build their rude nests and rear their young upon trees, similar to all the pigeon tribe.

Lophyrus (Vieillot).

Bill moderate, rather slender, and slightly gibbous towards the tip; upper mandible channelled (sillonnée) on the sides, inclined towards the point; nostrils situated in a groove; wings rounded (Vieillot).

Example.—*Lophyrus coronatus*, *Columba coronata*, Latham; *Phasianus cristatus Indicus*, Brisson; *Columbi Hocco*, Le Vaill.; *Colombe Galline Goura*, Temm.; *Great Crowned Pigeon*, Edw. A species surpassing in size all the other *Columbidæ*. Total length from twenty-seven to twenty-eight inches; bill two inches long, black, tips of mandibles thickened, that of the upper one somewhat deflected; head with a large, elevated, semicircular, compressed crest of narrow straight feathers, with decomposed

or rather disunited silky barbules always erect; crest and body below greyish-blue; feathers of back, scapulars, and smaller wing coverts, black at the base, rich purple-brown at the tips; greater coverts same colour, but centrally barred with white, forming a single transverse band across the wings when closed; quills and tail deep grey, the latter terminated with greyish-blue; legs grey; tarsi 3½ inches in length, covered with rounded scales not closely set, with a white border of skin round each; toes strong and somewhat short, scales placed as in the *Columbinæ*.

Locality and Habits.—Many of the islands of the great Indian group. Not rare in Java and Banda, abundant in New Guinea, and in most of the Moluccas. Nest built in trees; eggs two; cooing of the male hoarse, accompanied by a noise somewhat like that of a turkey cock when strutting; food—berries, seeds, grain, &c.; flavour of the flesh said to be excellent.

'In this magnificent and beautiful bird,' says Mr. Selby, 'we observe a combination of form different from that of the ground pigeons, so lately described; for, instead of the marked affinity to the typical rasorial families, the *Pavonidæ* and *Tetraonidæ*, so decidedly exhibited by these species, both in their mode of life, and in their deviation from the usual Columbine figure, we have, in the present instance, an approximation of structure much nearer that of some of the *Cracidæ*, another tribe of birds which constitutes an aberrant family of the Rasorial Order, and it is on this account we think that this bird cannot well be placed in the same division with the ground doves, but must constitute the type of a separate group.'



[Lophyrus coronatus.]

FOSSIL COLUMBIDÆ.

Dr. Buckland enumerates the bones of the pigeon among the remains in the cave at Kirkdale, and figures a bone which he says approaches closely to the Spanish runt, which is one of the largest of the pigeon tribe, meaning, we suppose, the *Columbidæ*.

COLUMBINE. [AQUILEGIA.]

COLU'MBIUM, a metal discovered, in 1801, by Mr. Hatchett in a ferruginous mineral from North America. It was afterwards detected in some Swedish minerals by Ekeberg, who supposed it to be a different and new metal, to which he gave the name of *Tantalium*. Dr. Wollaston showed that the metals were the same. The minerals found in Sweden are *tantalite* and *yttro-tantalite*. The first, sometimes called also *Columbite*, occurs amorphous and nodular, and also crystallised in the form of a right rhombic prism. The massive variety is either granular or compact; the crystals are greyish-black: fracture uneven. hardness, 6: specific gravity, 6·038: lustre, imperfect metallic: it is opake. It contains about 80 per cent. of oxide of columbium, 12 of oxide of iron, and 8 of oxide of manganese. The yttro-tantalite contains oxide of columbium, yttria, and some other substances.

Columbium is obtained with great difficulty. Berzelius procured it by heating potassium with the potasso-fluoride of columbium. It is a black powder, which by the burnisher acquires the colour and lustre of iron. The specific gravity is about 6. It is nearly insoluble in acids and in chlorine. When heated in the air it is oxidized, and converted into columbic acid.

Oxygen and *Columbium* combine in two proportions, forming columbic acid and oxide of columbium.

Columbic acid may be obtained by burning the metal in the air; it is colourless, insipid, and does not act upon vegetable blue colours. When heated with charcoal it is reduced to the state of oxide. If heated with iron it loses oxygen, and an alloy of iron and columbium is formed. Columbic acid combined with water forms a very white hydrate, which reddens vegetable blues. It combines with salifiable bases to form salts which are called *columbates*, but no one of them is of any importance, or applied to any purpose whatever.

Columbic acid is composed of

3 equivalents of oxygen . .	24
1 equivalent of columbium .	185
Equivalent . .	209

Oxide of Columbium is obtained by heating columbic acid to whiteness in a covered crucible. It is of a greyish black colour, very hard, and almost infusible.

Oxide of columbium consists of

2 equivalents of oxygen . .	16
1 equivalent of columbium .	185
Equivalent . .	201

Columbium combines also with chlorine and sulphur, &c., but these compounds are little known and of no importance.

COLUMBO, or COLOMBO, the capital and seat of the British government in Ceylon, is situated on the western coast of the island, 6° 57′ N. lat., and 80° E. long., 368 miles S.W. from Madras. The fort is on a promontory, two-thirds of the extent of which is washed by the sea. It derives strength from art and from nature: it embraces a circuit of about a mile and a quarter, and has eight principal bastions. Four of these bastions are towards the sea, and three face a lake and command the narrow approach from the town. The fort is surrounded, except on the side of the sea, with a deep moat, and a lake bordering on the glacis adds to the strength of the place. On the side of the sea, where the surf does not render a landing impracticable, every part is well commanded by the batteries. Inside the fort are several straight and regular streets. The residence of the governor, called the 'King's house,' is in King's Street; and behind it is the light-house, a beautiful edifice, lately erected, the light of which is ninety-seven feet above the level of the sea. The principal government offices and courts are within the fort; also an English church, a library, a medical museum, an hospital, two hotels, and numerous shops.

The lake before alluded to, being connected by canals with the Mutwal river, almost insulates the town. In the centre of the lake is a piece of land called Slave island, covered with cocoa-nut trees, and easy of access from the town or fort by a small stone bridge. It is the head-quarters of the Ceylon Rifle regiment.

Columbo has a small semicircular harbour admitting vessels not exceeding 200 tons. Ships of larger burden anchor in the roads. In the S.W. monsoon, from April to October, the best anchorage is found in from seven to eight fathoms, light-house bearing S. by E. ½ E., and the Dutch church E. by S. In the N.E. monsoon, from November to April, it is more convenient to anchor in six and a half fathoms, light-house bearing S. or S. ½ E. and the Dutch church E.S.E.

The town is regularly built, with fifteen streets, eight running E. and W. and the others at right angles to them. The houses are built of cabook, white-washed, and presents a good appearance. In 1814 there were 2654 houses within the gravets *. Between 1820 and 1829, 6512*l.* was collected by assessment for lighting and repairing the streets. The amount collected is greater than what is expended, and the surplus money is put out at interest, it being intended to discontinue assessments when the interest of the surplus shall amount to 1200*l.* per annum.

Among the public buildings are the Supreme Court-house, and the various public offices. There is also a library belonging to the burghers, a small-pox hospital, a masonic hall, and a number of religious edifices. The Dutch church, erected in 1746, is a lofty building in the form of a cross, standing in the centre of the town.

There are two steam-engines, and several native presses used in the manufacture of cocoa-nut oil.

The population is composed of Europeans, burghers, Malabars, Singhalese, and Moors, besides some Malays, Chinese, Parsees, Caffrees, and Pattangs; and according to the census of 1832, amounted to 31,519.

The commerce, external and internal, is very extensive, and daily increasing. The exports to Europe are cinnamon, pepper, coffee, cocoa-nut oil, plumbago, cordage, arrack, cardamoms, elephants' tusks, deer horns, tortoise-shells, ebony, satin-wood, &c.; and the imports consist of articles of European manufacture.

The climate of Columbo is very salubrious. The mean daily variation of the temperature is from 76° to 86½° Fahr. The tropical rains are here sometimes accompanied with dreadful thunder storms.

Columbo is mentioned in Singhalese history as early as 495 A. D. About the year 1371 it was frequented by trading vessels, and a colony of Malabars took possession of the place, and threw up fortifications, but they were soon expelled. The Portuguese visited Columbo in 1518, and soon after erected a fort; but the Singhalese, roused to resentment by the tyranny of the Portuguese, invested the fort with an army of 20,000 men, and besieged it for six months, when the Portuguese were enabled, by means of reinforcements from Goa, to disperse the Singhalese, and make their king sue for peace. The fort was at one time demolished in compliance with orders from Portugal, but a new fort was afterwards erected; and being firmly established in it, the Portuguese, by taking part in the intestine wars, gradually extended their influence over the whole island. In 1656 the Dutch wrested Columbo from them after a siege of seven months, and expelled them from the sea coast. In 1796 the Dutch surrendered it to the British.

COLUMBUS (a name latinized from the Italian Colombo, and the Spanish Colon) was born at Genoa†, about the year 1445 or 1446‡. His father, who was a wool-comber, sent him to Pavia, then the great school of learning in Lombardy; but Columbus having shown a taste for geometry, geography, and astronomy, or, as it was then termed, astrology, went to sea at fourteen years of age. In addition to the hardy encounters and dangers attending the sea-faring life of that age, he was often under the rigid discipline of an old relation, Colombo, who carried on a predatory warfare against Mohammedans and Venetians, the great rivals of the Genoese. In February, 1467, Columbus, in order to ascertain whether Iceland was inhabited, advanced 100 leagues beyond it, and was astonished at not finding the sea frozen. He also visited the Portuguese fort of St. George la Mina, on the coast of Guinea.

About the year 1470, he settled at Lisbon, then the great resort of travellers and navigators, whom Prince Henry § highly encouraged. Here Columbus married the daughter of an Italian, called Patestrello, who had colonized and who governed the island of Porto Santo, and whose papers, charts, and journals, were highly serviceable to Columbus in his occasional expeditions to Madeira, the Canaries, the Azores, and the Portuguese settlements of Africa, and for the construction of maps and charts, which he sold to support his family, and his aged father at Genoa, as well as to defray the education of his younger brothers. Columbus resided also some time at the island of Porto Santo, which had not long been discovered, a circumstance which at a period of great excitement and expectation as to maritime discovery, kindled his mind to enthusiasm, which was heightened by the allusions in the Bible to the ultimate universal diffusion of the gospel, which Columbus hoped that he was predestined to extend to the eastern extremity of Asia. He considered his projected discoveries as only a means to this end, and also for supplying him with ample treasures to furnish an army of 50,000 foot soldiers and 5000 horse for the recovery of the holy sepulchre. Moreover the legends of the island of Cipango (Japan), of Mango (Southern China), and Cathay, the opinions of the antients, the travels of the moderns, the conjectured sphericity of the earth, its supposed smallness, and the imaginary prolongation of Asia to the east, all this presumptive evidence, added to the recent application of the astrolabe to navigation, gave him so firm a conviction of the practicability of crossing the Atlantic, and of landing on the eastern shores of Asia, that, after long delays, and repeated disappointments and struggles with poverty, he never made any abatement in those conditions which appeared to all the states* to whom he made proposals to be the extravagant demands of a mere adventurer. John II. of Portugal, after having referred the project to a maritime junto, and to his council, both of whom regarded it as visionary, nevertheless sent a caravel under the pretext of taking provisions to the Cape Verd Islands, but with secret instructions to try the route marked in the papers of Columbus. The pilots however losing all courage, put back to Lisbon, and ridiculed the scheme. Indignant at such duplicity, Columbus sought patronage elsewhere, and sent his brother Bartholomew to make proposals to Henry VII. of England.

In 1484 Columbus arrived at Palos de Moguer in Andalusia. Stopping one day at the Franciscan convent of La Rabida to beg some bread and water for his child, the guardian or superior, Juan Perez Marchena, passing by, and entering into conversation with the stranger, was so struck with the grandeur of his views, that he detained him as a guest, and sent for the physician of Palos, Garcia Fernandez, to discuss the project. Now, for the first time, it began to be listened to with admiration. Marchena, taking charge of the maintenance and education of the young son of Columbus, gave the father a letter of introduction to the confessor of Isabella, Fernando de Talavera. This expected patron treated the wandering petitioner as a dreaming speculator, and a needy applicant for bread. His humble dress, and his want of connexions and academic honours, formed, in the eyes of all the courtiers, an inexplicable contrast with his brilliant proposals and aspirations. But indigence, contumely, and indignities of all kinds, could not shake the perseverance of Columbus. At last, through Cardinal Mendoza, he obtained an audience of King Ferdinand, who referred the matter to a conference of learned monks, which was held in the convent of the Dominicans of St. Stephen at Salamanca. At the very opening of the discussion Columbus was assailed with biblical objections, against which no mathematical demonstration was admitted· but he met them on their own ground. He poured forth texts and predictions as mystical types of his proposed discovery. The inquiry however, after intentional procrastination, ended in an unfavourable report. After seven years wasted at the Spanish court in solicitation, occasional hope, and bitter disappointment, a connexion with a lady of Cordoba, Beatriz Enriquez, prevented his entirely breaking with Spain. She was the mother of his second son, Ferdinand, who became his historian, and whom he always treated on terms of perfect equality with his legitimate son Diego. Columbus was now about to apply to the French king, from whom he had received a letter of encouragement; when, returning for his eldest son, Diego, to La Rabida, the warm-hearted friar Marchena endeavoured to dissuade him from this project, sent again for the physician, Garcia Fernandez, and also called to their council Alonso Pinzon. This distinguished navigator not only approved of the projected voyage, but offered to engage in it with his money and in person, and even to defray the expenses of a new application at court.

The ardent friar lost no time in writing directly to Queen Isabella, and on her requesting a verbal explanation of the

* The town of Columbo is divided into four gravets, or districts.

† As he twice declares in his own will, but this fact, as well as the history of his early days, is involved in obscurity. His son Fernando, unwilling, from mistaken pride, to reveal the indigence and humble condition from which his father emerged, has left the biography of Columbus very incomplete.

‡ This is only inferred from two of his letters to Ferdinand and Isabella, in one of which he states that he went to sea at the age of fourteen, and in another, dated 1501, that he had been in maritime service nearly forty years.

§ This prince was far before his age. He established a naval college, and erected an observatory at Sagres.

* Genoa, Portugal, Genoa again, Venice, France, England, and Spain.

subject, he immediately went to Santa Fé, where she was then superintending with Ferdinand the close investment of Granada. Isabella, who had never heard the proposition urged with such honest zeal, enthusiasm, and eloquence, and who was besides more open to noble impulses than her husband, was at last moved in behalf of Columbus, but her favour was checked by her confessor Talavera, who, being now raised to the see of Granada, was more astonished than ever at the lofty claims of this indigent and threadbare solicitor. Those claims would be exorbitant in case of success, he observed; how unreasonable then would they appear in case of failure, which was almost sure to happen, and which would prove the gross credulity of the Spanish monarchs. More moderate, yet highly honourable and advantageous terms were offered to Columbus, but he considered them beneath the dignity of his enterprise, and determined once more to abandon Spain for ever.

Some friends, who considered his departure as an irreparable loss, once more remonstrated with Isabella, who at last offered her own jewels to defray the expenses of the expedition, and thus overcame the coolness of Ferdinand. Accordingly, a messenger was sent to overtake Columbus, who, after some hesitation, returned to Santa Fé. Stipulations were at last signed by Ferdinand and Isabella, at Granada, the 17th of April, 1492.

On Friday, the 3rd of August, 1492, Columbus, as admiral of the seas and lands which he expected to discover, set sail from the bar of Saltes, near Palos, with three vessels and 120 men, who were full of doubts and fears, and were partly pressed into the service. Two of these vessels were caravels, or light barques, no better than our river and coasting craft. This, however, Columbus considered an advantage, as it would afford him the means of examining shallow rivers and harbours. On the 5th, one of the vessels had her rudder broken; but fortunately, on the 6th, he perceived, as he expected, the Canaries, where he refitted. On the 6th of September he hastily quitted Gomera, to avoid three frigates which were sent against him by the King of Portugal from spite at seeing Columbus engaged in the Spanish service. As soon as the Canaries were out of sight consternation and despair spread among the crews, and the admiral was obliged to leave them in ignorance of the progress they were making*. He also forbade the variation of the needle to be mentioned to the crew, which he observed on the 13th of September, about 200 leagues W. of the island of Ferro, till it was noticed also by his pilots, when he succeeded in allaying their terrors with his ready ingenuity to meet any emergency, by ascribing the phenomenon to the movement of the pole star. The whole expedition being founded on the presumption of finding land to the west, Columbus kept steadily to this course, lest he should appear to doubt and waver, and never went in search of islands, which floating weeds, birds, and other indications, gave him reason to believe were not far off.

On the 20th of September the wind veered to the S.W.; and although unfavourable to the expedition, this circumstance cheered the dismayed crew, who were alarmed at its continuance from the E., which seemed to preclude all hope of their return. Repeated disappointments made the crews at last regard all signs of land as mere delusions. On the evening of the 10th of October they exclaimed more violently than ever against the obstinacy of an ambitious desperado, in tempting fate on a boundless sea; they even meditated throwing the admiral overboard, and directing their course homeward. Columbus, for the last time, tried to pacify them in a friendly manner; but this only increased their clamour. He then assumed a decided tone, acted in open defiance of his crews, and his situation became desperate. That he ever yielded to his men, rests on no other authority than that of Oviedo, a writer of inferior credit, who was grossly misled by a pilot of the name of Hernea Perez Matheos, an enemy to Columbus. Fortunately, on the 11th, the manifestations of land were such as to convince the most dejected. Accordingly, after the evening prayer, Columbus ordered a careful look-out, and himself remained on the high stern of his vessel from ten o'clock, when he had observed glimmerings of light, as he supposed on shore, till two in the morning, when the foremost vessel fired a gun as a signal of land having been discovered. Not an eye was closed that night, all waiting with intense feeling for the dawn of the 12th of October, 1492, which was to reveal the great mystery of the ocean, whether it was bounded by a savage wilderness, or by spicy groves and splendid cities, possibly the very Cipango, the constant object of the golden fancies of the admiral. With tears of joy, after fervid thanksgivings, Columbus kissed the earth on which he landed, and with great solemnity planted the cross in the new world at Guanahani, or San Salvador*, one of the Gucayos, Lucayan or Bahama Islands. Those who had lately been most in despair were now the most extravagant in their joy. The most mutinous and outrageous thronged closest round the admiral, and crouched at the feet of a man who in their eyes had already wealth and honours in his gift.

The naked and painted natives, when they had recovered from their fright, regarded the white men, by whose confidence they were soon won, as visitors from the skies which bounded their horizon; they received from them with transport toys and trinkets, fragments of glass and earthenware, as celestial presents possessing a supernatural virtue. They brought in exchange cotton yarn and cassava bread, which, as it keeps longer than wheaten bread, was highly acceptable to the Spaniards.

On the 24th, Columbus set out in quest of gold and Cipango. After discovering Concepcion, Exuma, and Isla Larga, Cuba broke upon him like an elysium; he no longer doubted that this beautiful land was the real Cipango. When this delusion was over, he fancied Cuba, which, to the time of his death, he took for part of the mainland of India†, to be not far from Mango and Cathay, so brilliantly depicted in his great oracle, Marco Polo. He next took Hayti, or Santo Domingo, for the ancient Ophir, the source of the riches of Solomon, but he gave it the Latin diminutive of Hispaniola, from its resembling the fairest tracts of Spain. Leaving here the germ of a future colony, he set sail homeward the 4th of January, 1493. A dreadful storm overtook him on the 12th of February. Columbus, fearing the loss of his discovery more than the loss of life, retired to write two copies of a short account of it. He wrapped them in wax, enclosed them in two separate casks, one of which he threw into the sea, and the other he placed on the poop of his vessel, that it might float in case she should sink. Happily the storm subsided, but another drove him off the mouth of the Tagus on the 4th of March; and although distrustful of the Portuguese, he was obliged to take shelter there. At last he landed triumphantly at Palos, the 15th of March, 1493. In his journey through Spain, he received princely honours all his way to Barcelona, where the court had gone. His entrance here, with some of the natives, and with the arms and utensils of the discovered islands, was a triumph as striking and more glorious than that of a conqueror. Ferdinand and Isabella received him seated in state, rose as he approached, raised him as he kneeled to kiss their hands, and ordered him to be seated in their presence.

On the 25th of September, 1493, Columbus left Cadiz on a second expedition, with seventeen ships and 1500 men. He discovered the Caribbee Islands, Puerto Rico, and Jamaica; and after repeated mutinies of his colonists, and great hardships, he returned against the the tradewinds to Cadiz, June 11, 1496. Having dispelled all the calumnies that had been accumulated upon him, Columbus embarked the 30th of May, 1498, at San Lucar de Barrameda, on a third expedition, with only six vessels. In this voyage he discovered La Trinidad, the mouths of the Orinoco‡, the coast of Paria, and the Margarita and Cubagua Islands. On the 14th of August he bore away for Hispaniola to recruit his health. The dissensions which arose here, the calumnies of miscreants who had been shipped off to Spain, countenanced as they were by envious courtiers at home, the unproductiveness of the new settlement, and regret at having vested such high powers in a subject and a foreigner, who could now be dispensed with, induced Ferdinand, in July, 1500, to dispatch Francisco Bovadilla to supersede Columbus, and bring him back in chains. Vallejo, the officer who had him in charge, and Martin, the master of

* He adopted throughout the voyage the stratagem of keeping two reckonings, one true and private, for his own guidance, the other merely for the crews, to keep them in ignorance of the great distance they were advancing.

* Navarrete contends that it must have been Turk Island, another of the same cluster, although this supposition is at variance with all the particulars of San Salvador, which are accurately described in the journal of Columbus.

† Owing to this mistake, the appellation of Indians was extended to all the Aborigines of the Americas.

‡ He imagined this river to proceed from the tree of life in the midst of Paradise, the situation of which was then supposed to be in the remotest parts of the east.

the caravel, would have taken his chains off; but Columbus proudly said, 'I will wear them till the king orders otherwise, and will preserve them as memorials of his gratitude.' He hung them up in his cabinet, and requested they should be buried in his grave. The general burst of indignation at Cadiz, which was echoed throughout Spain, on the arrival of Columbus in fetters, compelled Ferdinand himself to disclaim all knowledge of the shameful transaction. But still the king kept Columbus in attendance for nine months, wasting his time in fruitless solicitations for redress; and at last appointed Nicholas Ovando governor of Hispaniola in his place. With restricted powers and a broken frame, but with his ever-soaring and irrepressible enthusiasm, Columbus sailed from Cadiz again on the 9th of May, 1502, with four caravels and 150 men, in search of a passage to the East Indies near the Isthmus of Darien, which should supersede that of Vasco de Gama. Being denied relief and even shelter at Santo Domingo, he was swept away by the currents to the N.W.; he however missed Yucatan and Mexico, and at last reached Truxillo, whence he coasted Honduras, the Mosquito shore, Costa Rica, Veragua, as far as the point which he called El Retrete, where the recent westward coasting of Bastidos had terminated. But here, on the 5th of December, he gave up his splendid vision, and yielded to the clamours of his crews to return in search of gold to Veragua, a country which he himself mistook for the Aurea Chersonesus of the antients.

Finally, the fierce resistance of the natives and the crazy state of his ships forced him, at the close of April, 1503, to make the best of his way for Hispaniola with only two crowded wrecks, which, being incapable of keeping the sea, came, on the 24th of June, to anchor at Jamaica. After famine and despair had occasioned a series of mutinies and disasters far greater than any that he had yet experienced, he at last arrived, on the 13th of August, at Santo Domingo. Here he exhausted his funds in relieving his crews, extending his generosity even to those who had been most outrageous. Sailing homewards on the 12th of September, he anchored his tempest-tossed and shattered bark at San Lucar, the 7th of November, 1504. From San Lucar he proceeded to Sevilla, where he soon after received the news of the death of his patroness Isabella. He was detained by illness till the spring of 1505, when he arrived, wearied and exhausted, at Segovia, to have only another courtly denial of redress, and to linger a year longer in neglect, poverty, and pain, till death gave him relief at Valladolid on the 20th of May, 1506. Thus ended a noble and glorious career, inseparably connected with the records of the injustice and ingratitude of kings. To make some amends for the sorrows and wrongs of this great man, his remains received a pompous funeral, and his grave and coat of arms the following motto:—

> 'A Castilla y a Leon
> Nuevo mundo dio Colon.'

Although Sebastian Cabot discovered Newfoundland and Labrador in June, 1497, and Columbus did not touch the American continent till he visited the coast of Paria in August, 1498, Columbus, however, first reached Guanahani, and what may properly be denominated the Columbian Archipelago, and is really the discoverer of the New World.

The voyage of one Antonio Sanchez from the Canaries to Hayti in 1484, mentioned by the Inca Garcilaso and some other Spanish writers, is regarded as a fable. The accounts however of Spaniards and Portuguese who had sailed westward so far as to perceive indications of land, were useful to Columbus, according to his own avowal. Ferdinand and Isabella, in a written declaration of the 4th of August, 1494, ascribe the new discoveries to Columbus. Amerigo Vespucci, whose name was afterwards given to the new hemisphere, did not see it till he accompanied Ojeda, as a pilot, to the coast of Paria in 1499.

The following are the principal authorities for the Life of Columbus:—'Navigatione del Re di Castiglia delle Isole e Paesi nuovamente ritrovati,' and the Latin translation, 'Navigatio Christophori Colombi,' Vicenza, 1507; 'Itinerarium Portugallensium,' Milan, 1508; Grinæus, 'Novus Orbis Regionum,' Bâle, 1533; Life of the Admiral, by his son Fernando, Oviedo; 'Chronicle of the Indies,' Sevilla, 1535; Manuscript History of Fernando and Isabella, by the curate of Los Palacios; Manuscript History of the Indies, by Las Casas; 'Letters and Decades of the Ocean,' by Peter Martyr d'Anghierra, or Angleria; Herrera, 'History of the Indies;' 'Robertson's America;' Churchill's Voyages, vol. ii.; Navarrete, 'Relacion de los quatro Viajes de Cristobal Colon;' Irving's Life of Columbus.

COLUMBUS. [OHIO.]

COLUMELLA, LU'CIUS JU'NIUS MODERA'TUS, the author of one of the most valuable works on Roman agriculture, if not himself a native of Gades (Cadiz), sprung from a family belonging to that town, which had been long most intimately connected with Rome. In several parts of his work he speaks of a paternal uncle, Marcus Columella, who had lived in Baetica (Andalusia), and had been well known as an intelligent agriculturist. In particular he speaks of his success in the improvement of the breed of sheep by the introduction of rams from Mauretania, and it has been suggested that the celebrated stock of the Merinos owes its origin to this importation. The author himself possessed an estate in the country of the Ceretani (La Cerdaña), near the Pyrenees, where he was eminently successful in the growth of the vine. When he wrote his work, he appears to have been residing either at Rome, or in the neighbourhood; but he had a personal knowlege of many parts of the Roman empire. He himself mentions a residence of some length in Cilicia and Syria (ii. 10, 18), but without stating the object which carried him into that part of the world. The period at which he lived and wrote may be most safely deduced from his own writings. On the one hand he mentions his having been present at a conversation on agriculture in which L. Volusius took part (i. 7, 3), and the terms he uses imply that many years had since elapsed. Now the death of this very man happens to be specially noticed by Tacitus at the end of the year A. D. 20 (*Ann.* iii. 30). Again he speaks of Seneca as still living (iii. 3, 31); and the tragical death of Seneca, it is well known, occurred in the year 66. He speaks moreover of Varro as preceding him by two generations. He was born therefore about the beginning of the Christian æra.

The work of Columella is addressed to Publius Silvinus, and consists of twelve books: the two first on the choice of a farm and farm-house, the selection of slaves, the cultivation of arable and pasture land: the three next on the cultivation of the vine, olive, and fruits of the orchard, &c.; the sixth and seventh, on the ox, horse, mule, ass, sheep, goat and dog, that is, the shepherd's dog and the house dog, for he specially excludes the sporting dog, as interfering with, instead of promoting, the economic management of a farm. The eighth book treats of the poultry-yard, and the ninth, of bees. The next, which has for its subject the vegetable and flower garden, presents the unusual spectacle of a poem in the middle of a prose work. This form was selected by Columella at the pressing solicitation of his friend Silvinus, and the poem was avowedly put forth as a supplement to the Georgics of Virgil, in answer to the challenge of the Mantuan bard:

> 'Verum hæc ipse equidem spatiis inclusus iniquis
> Prætereo, atque aliis post me memoranda relinquo.'

In the eleventh book the author is again on the terra firma of prose, and gives us in three long chapters, not very closely connected, the duties of a bailiff, a farmer's almanack, and the vegetable garden. This book is sometimes entitled the 'Bailiff' (Villicus); as the last bears the name of the 'Bailiff's Wife' (Villica), and treats of the indoor duties, the making wine and vinegar, preserving fruits, &c.

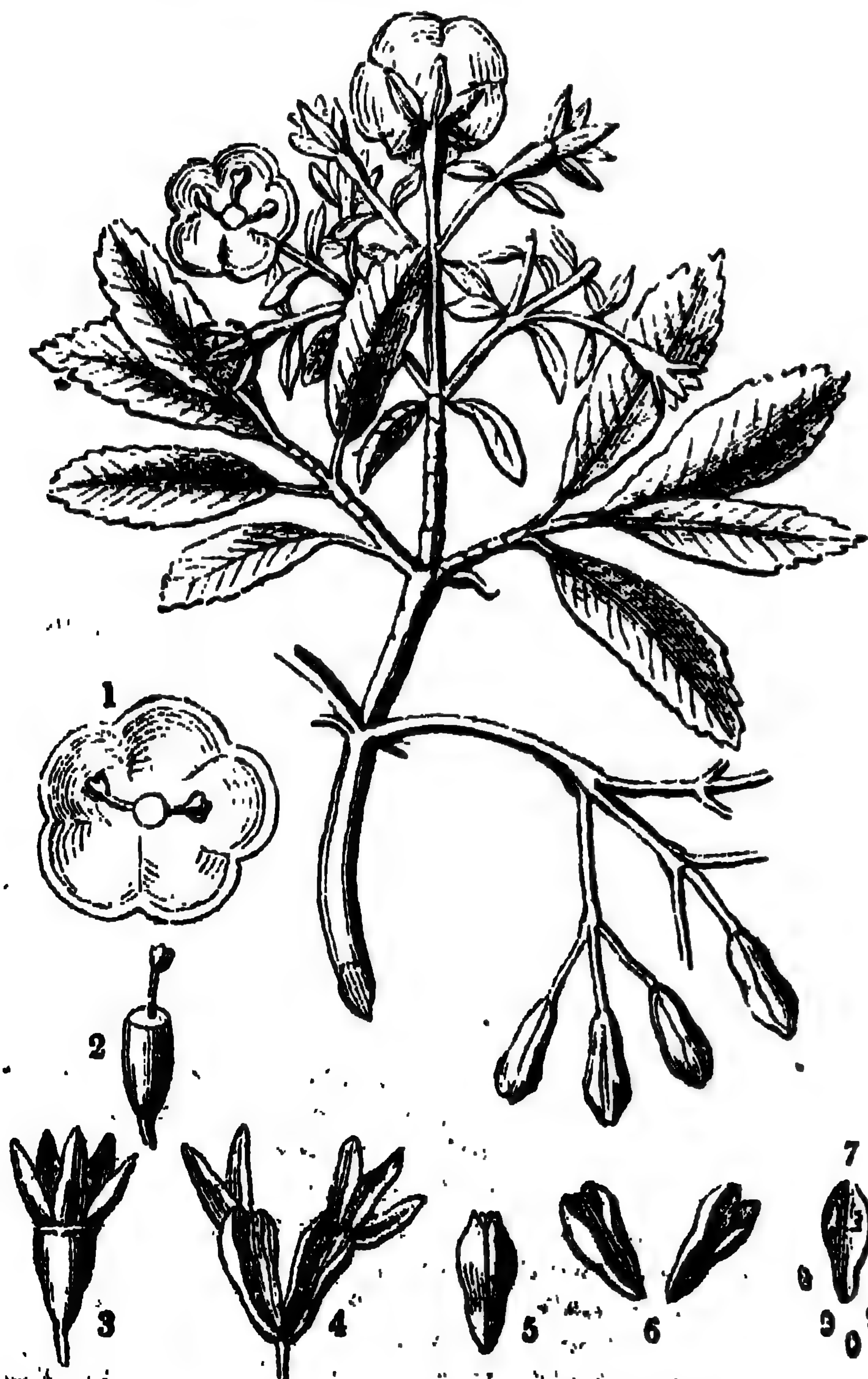
In the composition of this work, Columella has made free use of the Roman writers on agriculture who preceded him. Among these we may particularly mention Cato the Censor, Terentius Varro, his own contemporaries; Cornelius Celsus and Julius Atticus; and lastly, Julius Græcinus, the father of Agricola, who seems to have shown his predilection for the science by the name he selected for his son. But the author of whom he speaks in the highest terms, and to whom he most willingly appeals, is Mago the Carthaginian, whose work on agriculture, as he tells us, containing eight-and-twenty books, was translated from the Phœnician into Latin, under a special decree of the Roman senate. The latinity of Columella has nearly all the purity of the Augustan age; but wherever his subject gives him an opportunity, he discovers a taste for that sentimental and declamatory style which distinguishes the writers of the first and second centuries. His poem is deficient in all those qualities which give grace and beauty to the Georgics. Columella is often cited by Pliny the Elder in his 'Natural History,' but generally with an expression of dissent. He is also quoted by Vegetius and Palladius.

But the treatise on agriculture by the latter appears to have superseded Columella's work, and to have thrown it altogether into oblivion. Besides the great work of Columella, which we have described, there is a single book entitled, 'De Arboribus,' in which reference is made to a preceding book now lost. These two appear to have been a portion of an early edition of the work on agriculture, probably in four books, which being afterwards enlarged, swelled into the twelve we now possess. Accordingly the matter of the 'De Arboribus' will be found with some alterations and many additions, in the third, fourth, and fifth books of the greater work; and Cassiodorus actually speaks of sixteen books written by Columella. In ignorance of this, the writers of many of the MSS., as well as the early editors, have inserted the minor treatise after the second book of the more complete work, thus causing many contradictions and great confusion in the numbers of the following books.

The writings of Columella have generally been published together with the works of the other authors 'De Re Rustica.' The chief editions are these: 'The Princeps,' Venice, fol. 1472; Bologna, fol. 1494; by Aldus, 8vo., 1513, or rather 1514; by R. Stephens, 8vo., 1543; by Gesner, Leipzig, 2 vols. 4to., 1735; and what may now be looked upon as the best, the edition by J. G. Schneider, 4 vols. 8vo, 1794—7. We are not acquainted with any English translation of Columella.

COLUME'LLA, the central part or axis in the theca of a moss, around which the spores are arranged without having any definite connection with it. Also the axis of any kind of fruit when separate from the carpels: in the latter case it is a hardened state of the growing point.

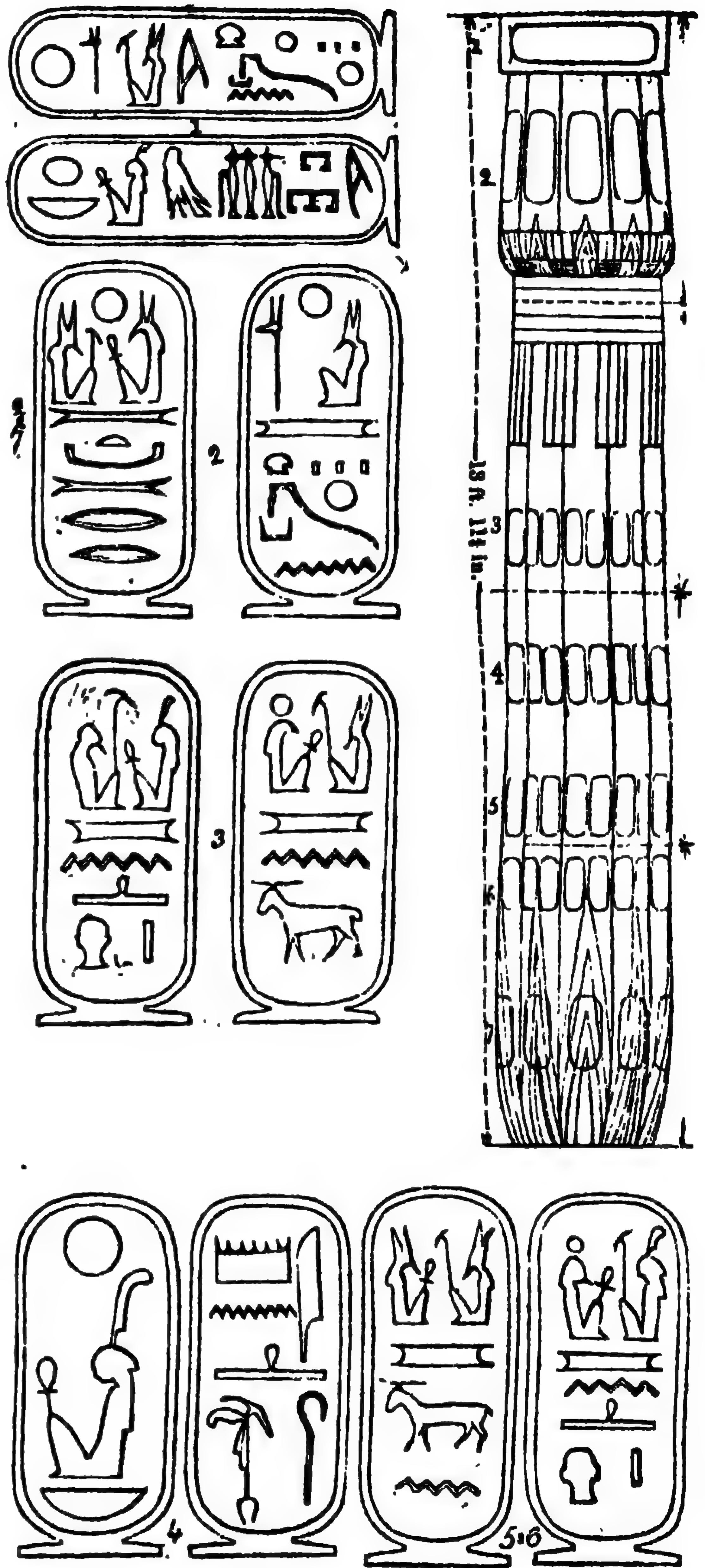
COLUMELLIA'CEÆ, a small diandrous order of monopetalous Exogens, with a superior five-parted calyx, a rotate corolla, three-lobed anthers bursting outwards, a two-celled ovary with an indefinite number of ovules and a capsular fruit. They are South American and Mexican bushes, looking like monopetalous Onagraceous plants, of doubtful affinity, and of no known use. (Lindley's *Natural System of Botany*, ed. 2, p. 240.)



[Columellia oblonga.]

1. A flower seen from above. 2. The ovary, style and stigma. 3. The half-ripe fruit. 4. The fruit opening, with the calyx adhering. 5. The pericarp separated from the calyx. 6. Valves of the pericarp. 7. One valve and seeds.

COLUMN, from the Latin columna. The column is a shaft of wood, stone, or iron, in the form of a truncated cone, a little swelled from the straight line at about one-third its height from the lower extremity. this swelling is called the entasis. The column is furnished with a base at the foot and a capital at the head of the shaft. Columns are of various proportions and kinds; circular on the plan, and rarely polygonal. The Romans had five models of columns, which were called orders; but the Greeks, from whom the Romans appear to have derived their architecture, only three. The Egyptians used columns, but they were very different in their form and proportions from both the Roman and Greek examples.



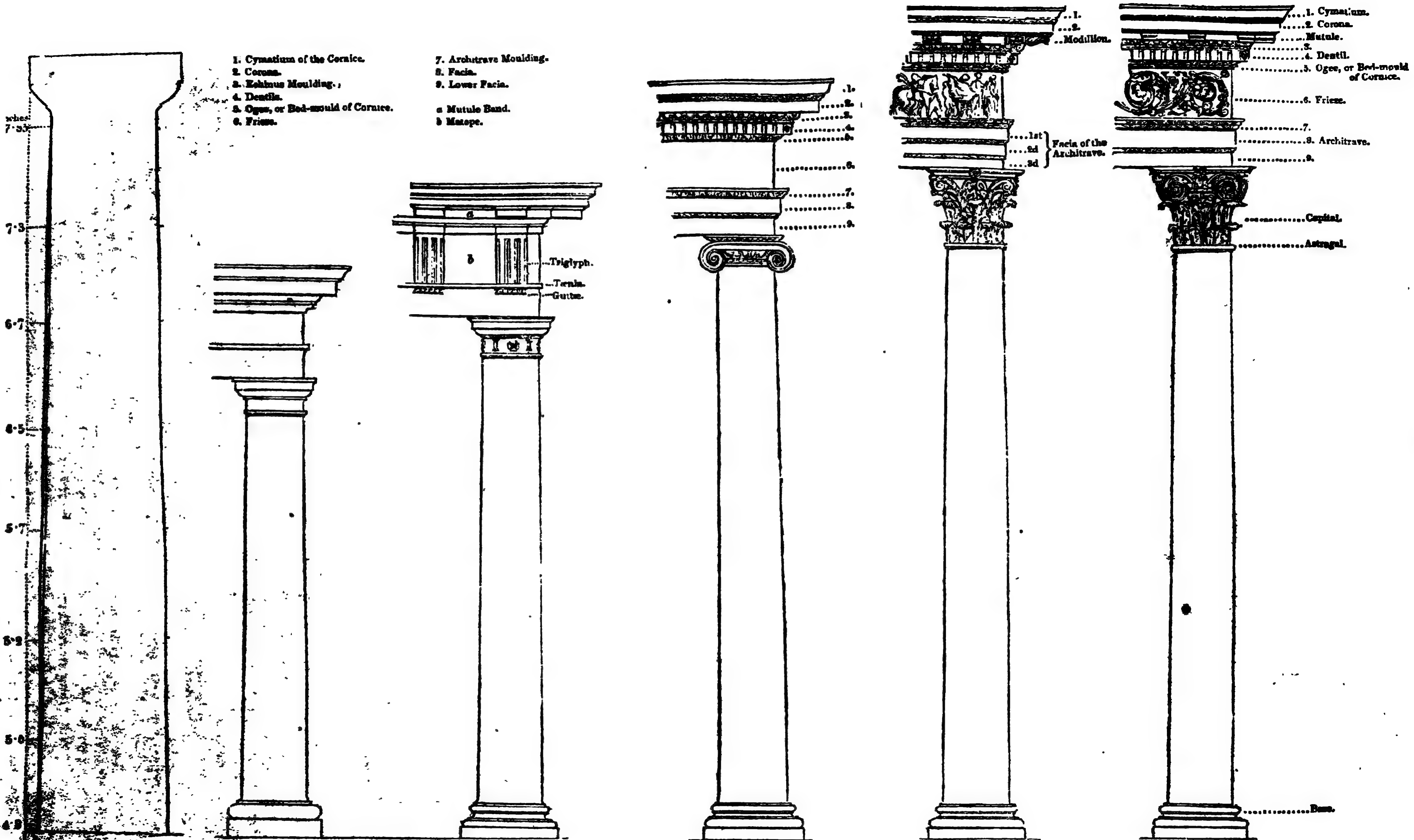
[Egyptian Column in the British Museum.]

The elliptical figures are the cartouches on the column, drawn to a larger scale. The height of the column is 18 ft. 11½ in.

The five orders are the Corinthian, Ionic, and Composite, which is a mixture of the two former; and the Doric and the Tuscan—two orders very similar in appearance and character to each other.

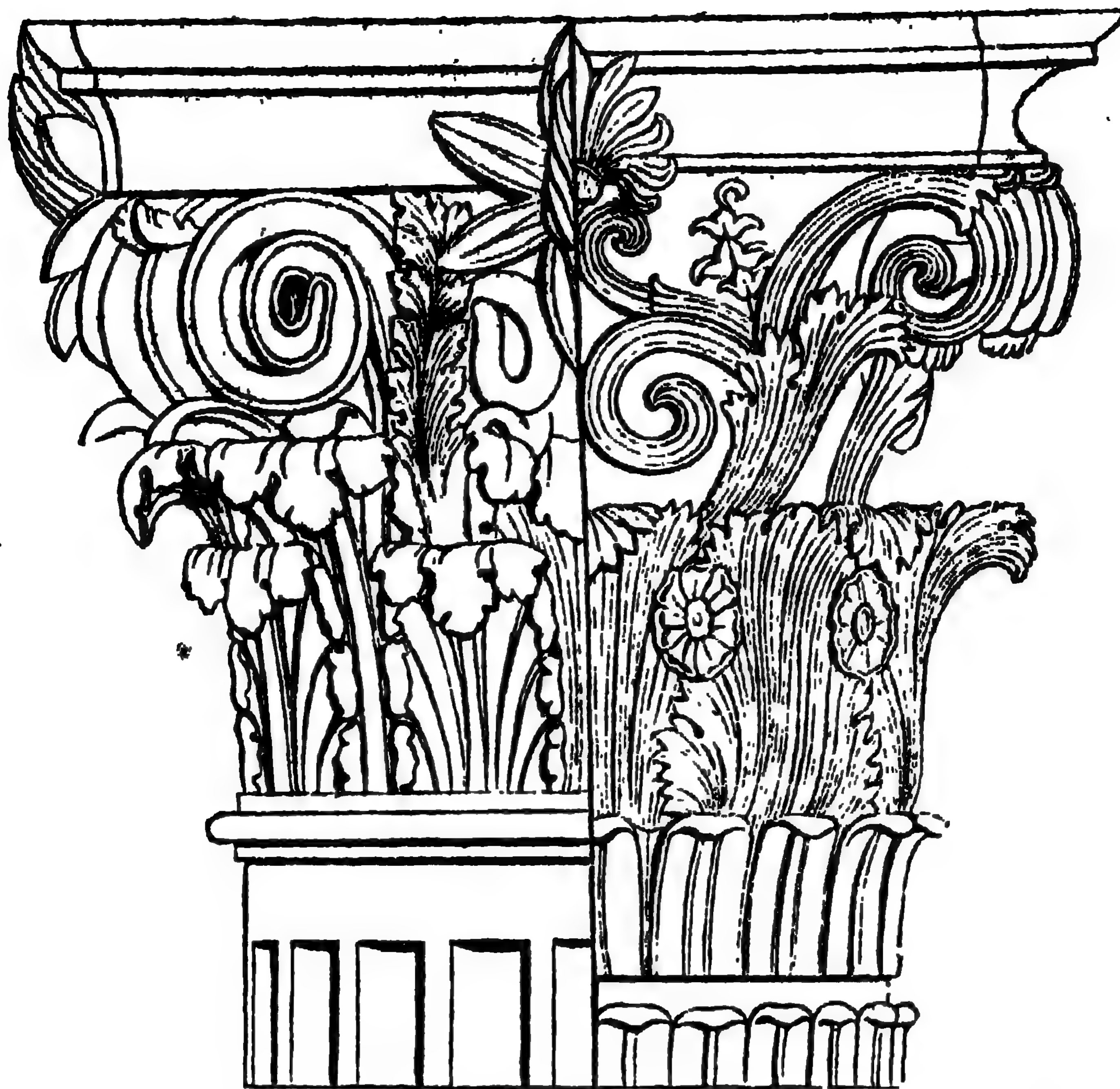
The Greek Corinthian, Doric, and Ionic differ from the Roman. The proportions of the orders vary slightly in almost every example of antiquity; but the distinguishing features are the capitals. The bases also vary in proportion, and sometimes in the profiles of their mouldings; but this is not so apparent to an ordinary observer as the difference in the capitals of the orders.

The Corinthian capital consists of the leaves of the acan-



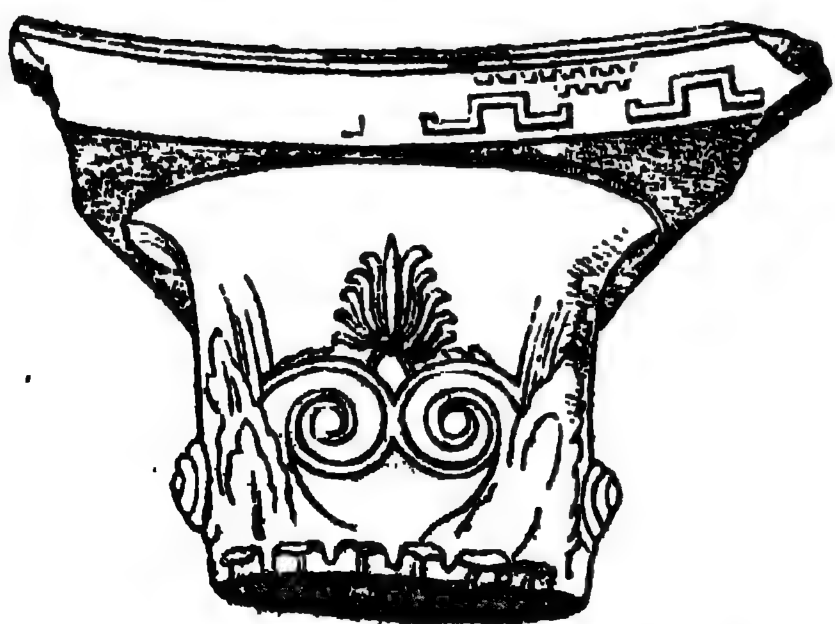
[[illegible] of a Greek Doric Column, from the 4th vol. of Stuart's Athens.]

[Drawn to the same scale of two Modules, by dividing the diameter into two parts, and each part into thirty parts or minutes.]



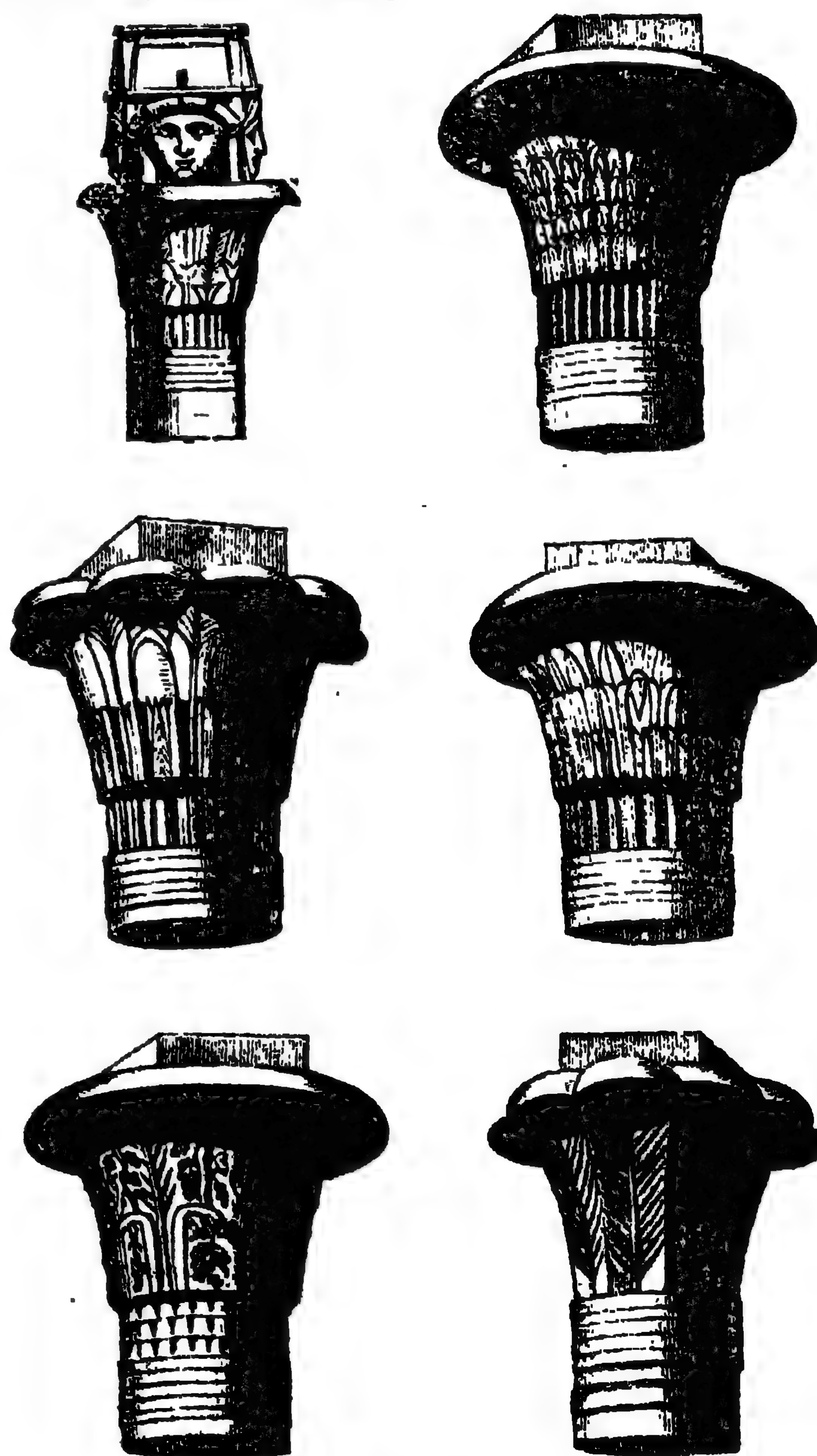
[Half the Corinthian capital of the Temple of Vesta, at Tivoli.] [Half the Corinthian capital from the monument of Lysicrates, at Athens.]

thus, with two spiral horns at each of the four angles of the abacus. In the centre between these horns are two smaller spirals attached to the bell of the capital; under these are two rows of acanthus leaves regularly disposed, eight being placed in each row, and eight large double leaves supporting the angular horns, called also volutes. These are the leading features of the Corinthian capital, although some are more ornamented than others, and have enriched details about the abacus and the bell, which others have not. The most striking difference between the character of the Greek and Roman foliage of the Corinthian column is this: the leaves of the Greek have angular points, and are almost straight on the sides; the Roman are rounded on the sides; the section of the hollow of the former is angular, while the latter is either a segment of a circle, or formed of two segments of a circle meeting in the centre of the hollow of the points of the acanthus leaf. The Greek leaves may be said to have more of the natural character of the acanthus, or the thistle, while the Roman is more artificial, and consequently less like the model from which the Greeks drew their capital. There are examples of the Greek Corinthian capitals, although much mutilated, in the Elgin collection in the British Museum; and casts of the Roman examples from the temple of Jupiter Stator, Mars Ultor, and the Pantheon, also in the British Museum. The bell of the Corinthian capital may be clearly understood from the annexed drawing of the mutilated single Corinthian capital



[Bell of a Corinthian Capital, a fragment from the Temple of Apollo, at Bassæ.—From the 4th vol. of Stewart's 'Athens,' published by Priestly and Weale, London.]

found in the Temple of Apollo at Bassæ, near Phigaleia; and the accompanying drawings of Egyptian capitals, from the French work on Egypt, will shew better than any elaborate description the strong resemblance of the Egyptian capital to the bell of the Corinthian capital, as we meet with the latter in the Temple of Jackly near Mylasa, and the Choragic monument of Lysicrates at Athens. The

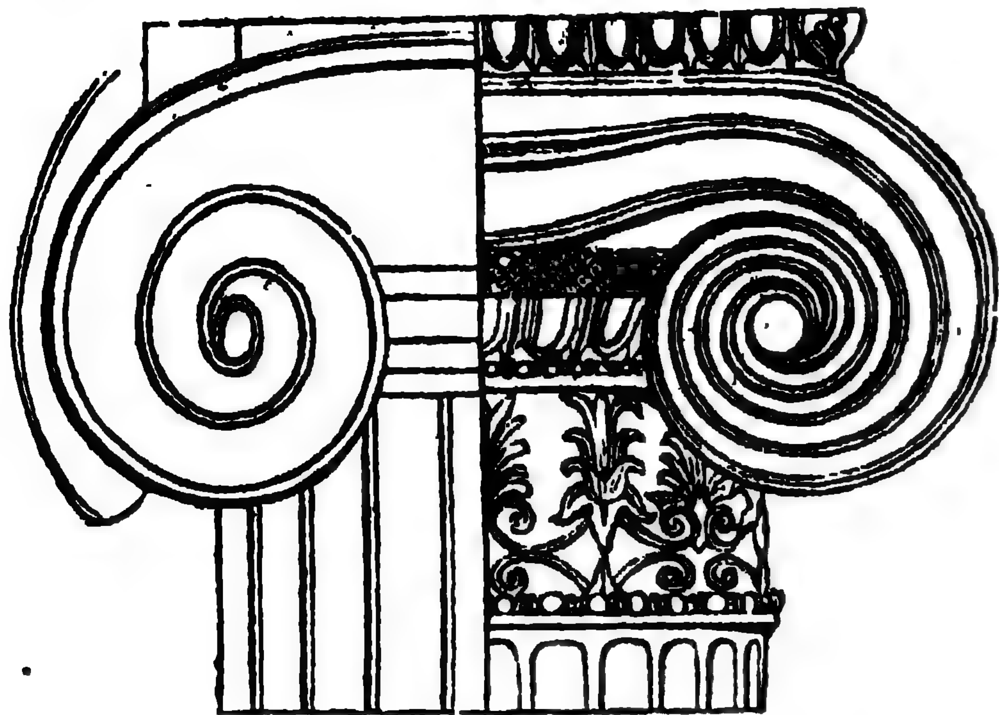


[Egyptian capitals.]

order of the Temple of Vesta at Rome, which very much resembles the order of the Temple at Jackly, was most probably copied from it. Among other peculiarities, it has the same defect of the leaves projecting beyond the line of the shaft, and is the only building of the Corinthian order, in Rome, which has a Greek character. Some Greek Corinthian capitals have only one row of acanthus leaves, and are without the horns under the abacus, the bell being

decorated with flat leaves called water-leaves, as in the Tower of the Winds at Athens.

The Ionic column is characterized by the two large spirals or volutes on two of its faces, connected under the abacus. The other sides connect these faces at right angles by a kind of baluster placed horizontally. Beneath this baluster



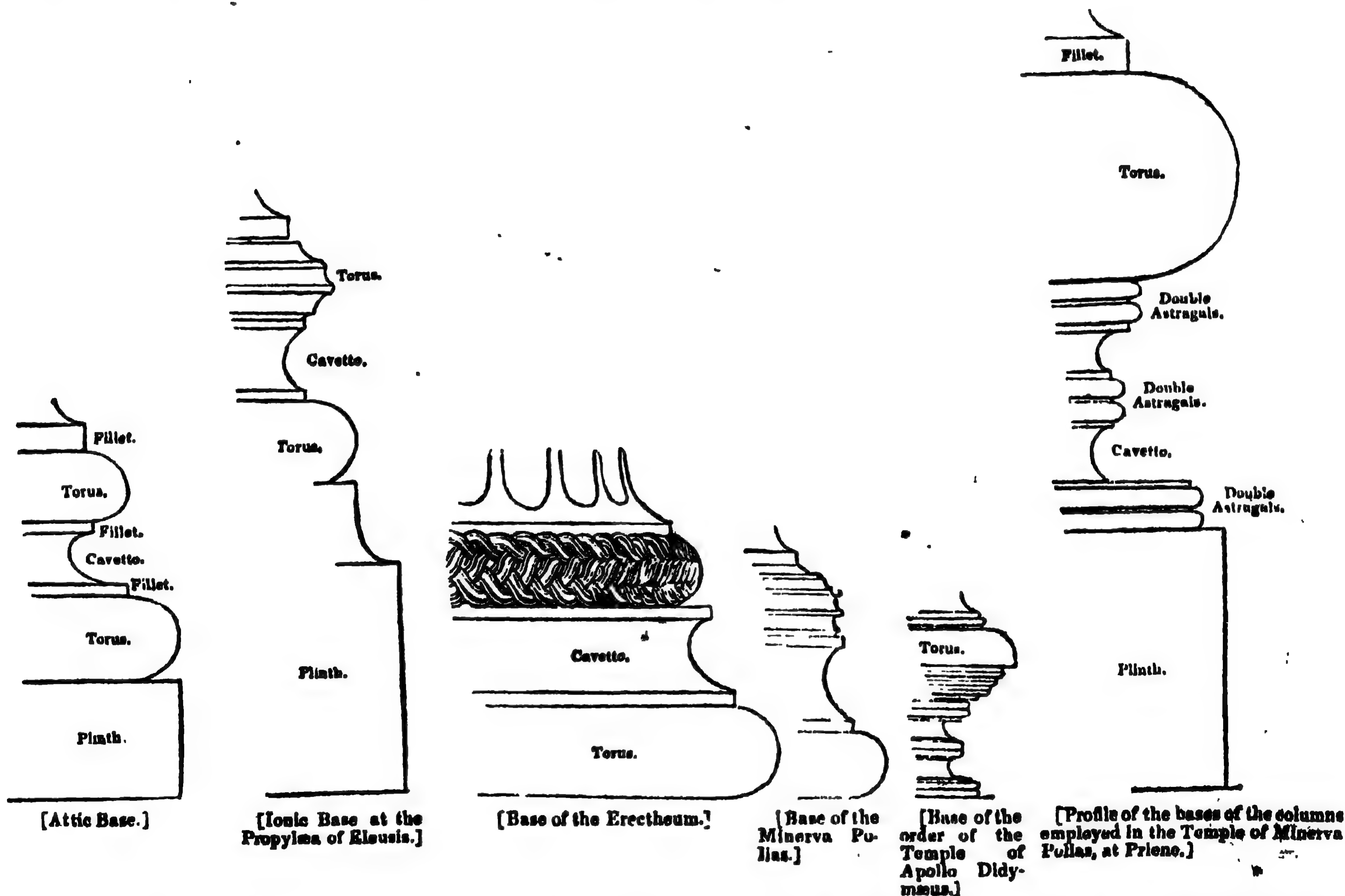
[Half the Ionic capital of the order employed in the cella of the Temple of Apollo at Bassæ.] [Half the capital of the Erectheum.]

and the astragal surmounting the top of the shaft of the column is the neck of the capital, which in some Greek examples is richly decorated; the baluster is also occasionally enriched. In some Ionic capitals all the faces of the volutes are conjoined at the extremities, the faces being curved inwards as in the Temple of Apollo at Bassæ. Ionic columns placed at the angles of porticos have sometimes the volute ingeniously formed at the angle, so as to present a voluted face either ranging with the volutes of the portico, or with the volutes of the columns at the side of the portico. The angle column of St. Pancras Church, London, has the angular faces curved. The angular volutes in some Roman examples are formed of two half volutes placed at right angles to each other. The bases of the Ionic vary perhaps more than any other order. In Roman examples the Attic base is employed.

The Composite column, as its name implies, is a compound. It is formed of the Corinthian and Ionic, but partakes more of the Corinthian character and proportions.

The Roman-Doric and Tuscan columns are shafts with moulded capitals and bases, the Doric only having a slight decoration of rosettes and buds in the neck of the capital, and some trifling additional mouldings. The Grecian Doric differs from the Roman both in proportion and in the mouldings of the capital, in the flutings being without fillets, and in its being almost always without a base.

An order includes the column with the whole of the entablature, or the superstructure raised on it, which is divided into architrave, frieze, and cornice.



[Attic Base.] [Ionic Base at the Propylæa of Eleusis.] [Base of the Erectheum.] [Base of the Minerva Polias.] [Base of the order of the Temple of Apollo Didymæus.] [Profile of the bases of the columns employed in the Temple of Minerva Polias, at Priene.]

All the great architects of the cinque cento, and after them those of the later Italian and French schools, have differed in the proportions and details of the orders, but for the most part in a trifling degree. The proportions of the five Roman orders which we have adopted here as our rule are those laid down in Sir William Chambers's Architecture, and which are generally employed by the English architects of the present day. The proportions of the orders used by the Greeks are from the authority of Stuart. The measure by which the proportions of the orders are determined, is the diameter of the base of the shaft of the column, which is divided into two parts called modules, and each module is divided into 30 parts called minutes. This scale is in general use in all countries which derive their architecture from the Greeks and Romans.

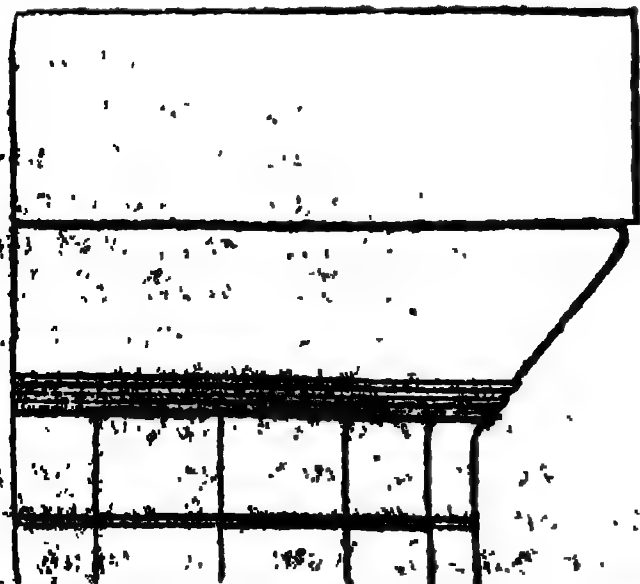
Thus the height of the shaft of the Tuscan order, from the upper line of the fillet of the base to the upper line of the astragal of the neck of the column, is 12 modules or semidiameters high; the base, including the plinth, is 30 minutes; the capital, 30 minutes; the architrave, 31½ minutes; the frieze, 31½ minutes; the cornice, including the bed-mould or ogee, 42 minutes; and the projection of the cornice, 42 minutes. The shaft of the Doric order is 13 modules, 28 minutes; the base, 30 minutes; the capital, 32 minutes; the architrave, 30 minutes; the frieze, 45 minutes; and the cornice, 45 minutes. The projection of the cornice is 57 minutes. The shaft of the Ionic order contains 16 modules, 9 minutes; the base, 30 minutes; the capital, from the upper line of the astragal, 21 minutes; the architrave, 40½ minutes; the frieze, 40½ minutes; and the cornice, 54 minutes. The projection of the cornice is 54 minutes. The Corinthian order has the shaft 16 modules, 20 minutes; the base, 30 minutes; the capital, 70 minutes; the architrave, 45 minutes; the frieze, 45 minutes; the cornice, 60 minutes;

and the projection, 58 minutes. The Composite order is similar in its general proportions to the Corinthian; and the columns of the Roman orders diminish in diameter about one-sixth, that is, are 50 minutes at the upper diameter of the shaft.* The Greek Doric varies very much in its proportions. The Doric of the Parthenon has the shaft and capital 10 modules 8 minutes high, and the entablature 3 modules 15 minutes. For a scale of the proportions of the leading features of some of the best known examples of antiquity, see the end of this article.

The Tuscan order, which is simple in its design, has a base formed of a plinth or squared piece of stone as a foundation, and a torus above it, surmounted with a fillet. The shaft is terminated with a fillet and an astragal, on which the capital is set, consisting of a necking (a prolongation of the shaft) and an ovolo moulding supporting the squared abacus, which is surmounted with a fillet. The architrave is a plain face with a broad fillet. The frieze also is a plain face. The cornice consists of an ogee, a fillet, an ovolo forming the bed-mould of the cornice, which consists also of the corona and fillet, surmounted with a cymatium.

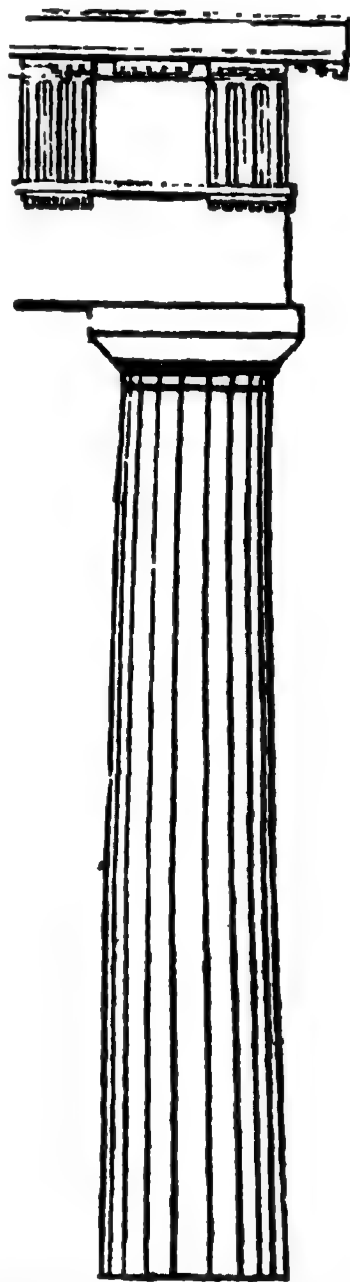
The Roman Doric, resembling in some particulars the Tuscan, is however very much richer. The Doric base consists of a plinth, a torus, a hollow moulding with a fillet above and below it; on the upper fillet is another torus and fillet, from which rises the shaft, curved where it springs from the fillet.† This is the Attic base, which is most commonly used in all the orders except the Tuscan. The shaft of the Doric is terminated like the Tuscan, and from the summit springs the capital with a neck enriched with rosets and buds. Above the necking are three flat annular rings or fillets, then an ovolo moulding surmounted with the abacus, which is finished with a small ogee moulding and fillet. The architrave is a plain face, with a flat band (*tænia*) and a fillet under the triglyph, with six guttæ or drops under the fillet. The frieze is divided into compartments with a triglyph over each column and one or more between, according to the width of the intercolumniation. The triglyphs which project slightly from the face of the frieze are channelled with angular channels and two half channels at the sides of the triglyph. The metope, or space between two triglyphs, is square or nearly so; this, however, depends on the intercolumns. The triglyphs are bound together by a facia, surmounted by a small fillet under the bed-mould of the cornice, which is an ovolo moulding or an ogee. Over this is the mutule band with the mutules, square in form, projecting over the triglyphs; an ogee surmounts the mutules and the mutule band. The mutules support the cornice, consisting of the corona, an ogee and fillet, and a cavetto or hollow moulding. The soffit or under-side of the cornice is sometimes enriched with pannels, and guttæ are placed under the mutules. The Doric of the theatre of Marcellus at Rome has dentils with an ogee bed-mould in the cornice in lieu of the mutules; and the basilica by Palladio at Vicenza is without either mutules or dentils, having instead of them a bold ogee and ovolo moulding, and the architrave divided into two faciæ.

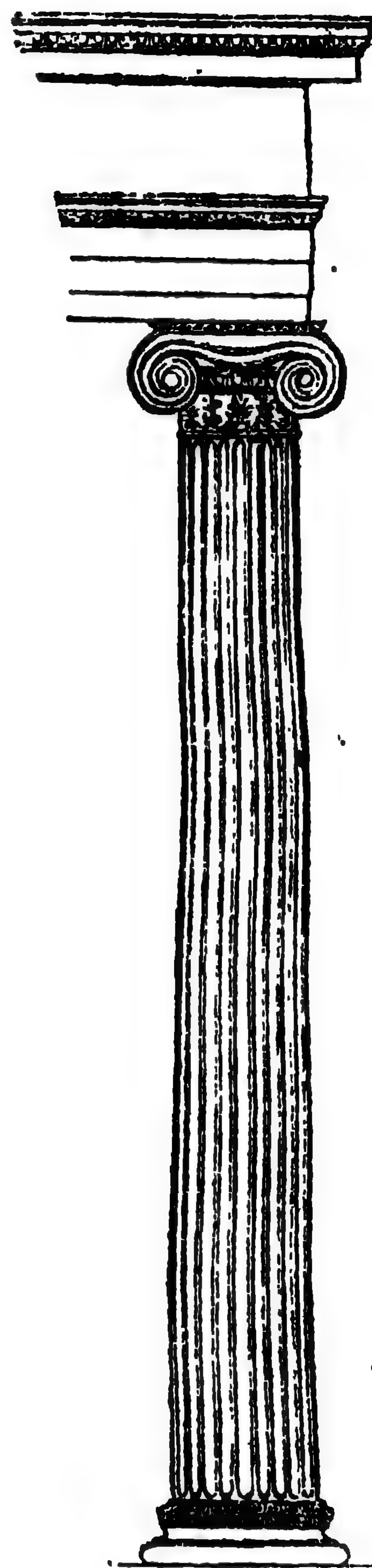
The Greek Doric differs considerably from the Roman, being almost always executed without a base. The flutings of the shaft are twenty in number without fillets; some examples are fluted only at the upper and lower extremities. The capital consists of a solid-looking abacus without any moulding above it, but supported by a very elegantly-curved echinus-moulding, which swells gradually out of the line of the shaft, being bound round by three annulets or rings near the top of the shaft, and on the under extremity of the echinus. A part of the shaft is also cut off by a sinking, or channel, cut into the shaft, forming the necking of the capital. The features of the entablature are very simple. [CIVIL ARCHITECTURE.] The triglyphs are not very dissimilar in the Roman and Greek Doric, except in the setting them off on the frieze. In the Roman they are invariably set over the centre line of each column, the angle of a building being terminated by a portion of a metope. In the Greek the triglyph is invariably commenced at the angle of the building, and not over the centre line of the column generally.


[Half the capital of the Parthenon at Athens.]

* By a reference to the proportions of some of the columns of antient edifices at the end of this article, some variations from this proportion will appear.

† The lower diameter of the shaft of a column is always measured from the point where this curve ends, and is joined to the straight line of the shaft.

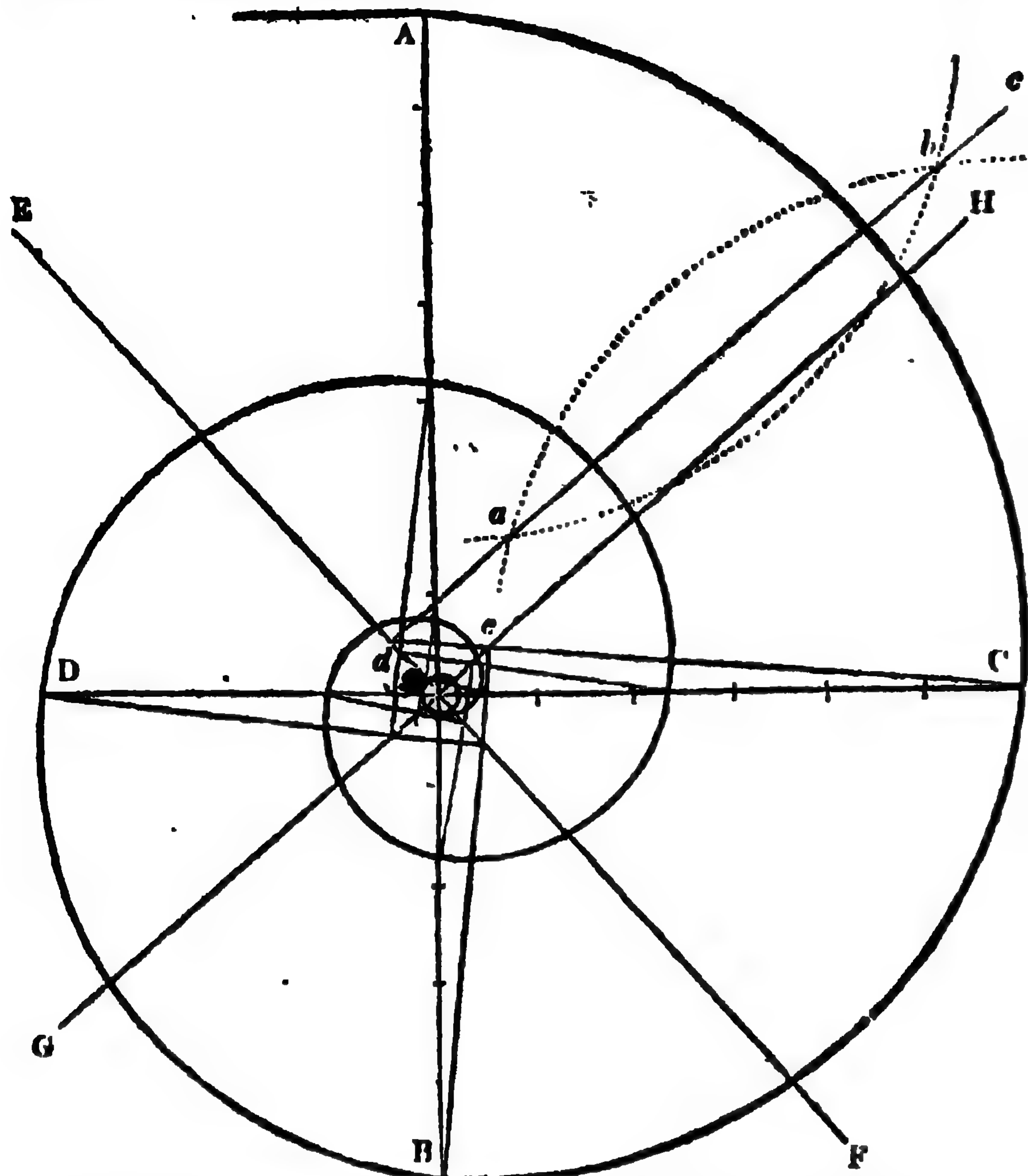

[Greek Doric order of the Parthenon.]


[Ionic order of the Erectheum at Athens.]

The Roman Ionic has an Attic base. The capital is formed with two volutes on two faces, and the volutes are connected by horizontal lines, though sometimes, like the Greek, the curved line is employed. The abacus is formed of a fillet and an ogee. Under the horizontal lines connecting the volutes is an echinus and astragal or bead-moulding enriched. The architrave is divided into two faciæ: the upper face is surmounted with a fillet and ogee enriched, and the lower with a small echinus, also enriched, having a narrow fillet underneath it. The frieze is usually plain, though the temple of Fortuna Virilis at Rome has a meagre decoration. The cornice is supported by an ogee moulding and dentils surmounted with a fillet, a bead moulding, and a large enriched echinus moulding. The cornice itself consists of a corona with a small ogee and fillet, on which is placed a cymatium. The volutes of the capital are connected at the sides by a pulvinus, or cushion, commonly called the baluster of the Ionic order. The Greek Ionic varies in its proportion, and is superior in beauty to the Roman example. The method of drawing the Roman volute called Goldman's volute, is described in Sir William Chambers's Architecture.

The following is a very accurate method of drawing the

Greek volute similar to the form of the volute of the Erectheum or Minerva Polias at Athens. Divide any perpen-

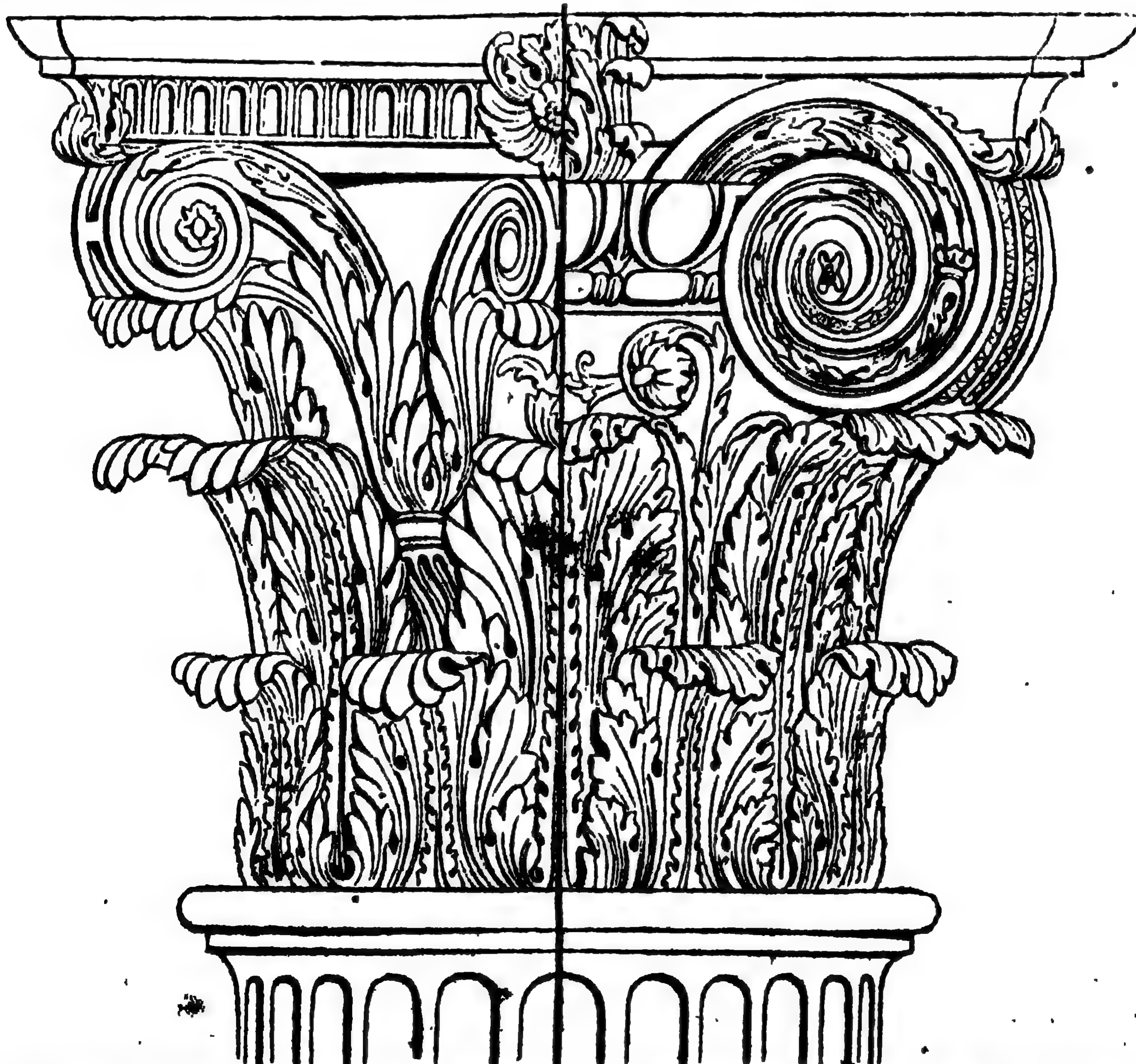


Method of drawing the spiral forming the volute of the Greek Ionic of the Erectheum and Minerva Polias Temples, at Athens.]

dicular height, A B, into 12 equal parts. Through the 7th division *g* from the top, draw the line C D at right angles to A B. Then upon the line C D, from the centre *g*, set off towards C six of the seven divisions between A and *g*. Draw the lines G H and E F, at angles of 45 degrees to the lines A B and C D respectively. Bisect the line joining A and C by *b a*, and produce it till it cuts E F in *d*. Then from *d*, as a centre, with the radius *d* A or *d* C, describe the quadrant A C of the volute. Then join C *d*, cutting the line G H in *e*; from the point *e* describe with the radius *e* C or *e* B the quadrant C B, passing through B, the extremity of the line A B; and proceed in this manner with all the quadrants till you touch the centre. The centres of the segments A C, C B, B D, &c., are always found on the diagonal lines E F and G H.

The best examples of the Roman Ionic order are fluted, with twenty-four flutings, or semicircular channels, divided by a narrow fillet, which is part of the surface of the shaft of the column. Some Greek examples, as at Bassæ, have only 20 flutings, and are without fillets.

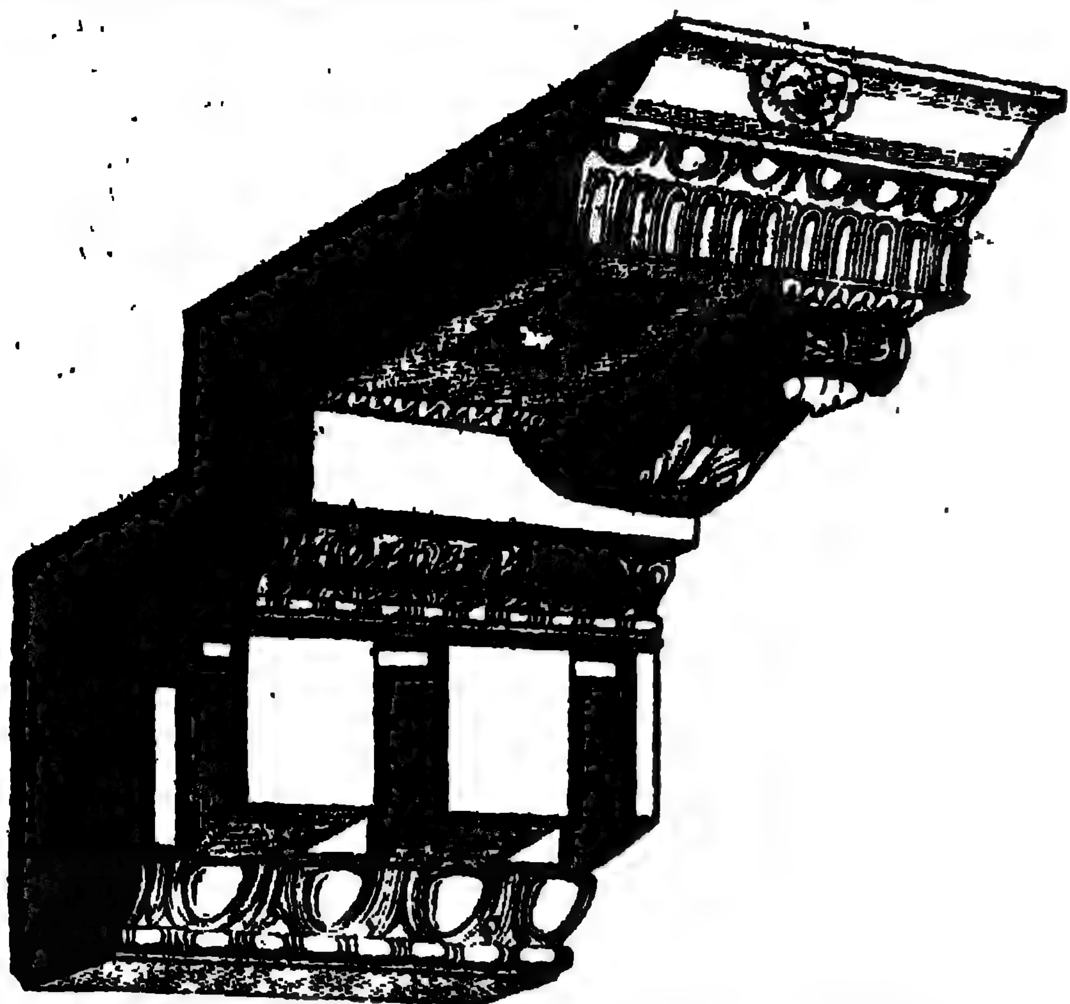
The general proportions of the Corinthian and Composite are the same, and they differ but slightly in their mouldings and enrichments. The base of both Corinthian and Composite is the Attic. The flutings of the shaft are, as in the Ionic, twenty-four, and divided by fillets. The capital is composed of two rows of acanthus leaves, eight in each row, and the upper row is placed between and over the divisions of the lower row. Four spiral volutes in each face rise out of two bunches of the acanthus leaf, and two of them are connected at the angles, and support the abacus formed of a cavetto and fillet, and an echinus, which are, except the fillet, sometimes enriched. The face of the abacus is formed of the segment of a circle, whose extremities are supported by the spiral horns, or volutes. The connected ends of the abacus form a narrow face, round which the mouldings are continued, although in some rare instances these ends are pointed by the intersection of the two curved faces of the abacus. The leaves and volutes are carved round



[Half the Corinthian capital, from Sir Wm. Chambers.] [Half the Composite capital, from Sir Wm. Chambers.]

what is a continuation of the shaft, formed into the shape of a bell reversed. The lower row of leaves generally follow the line of the shaft, which is considered the best system of setting them off round the bell, although the Temple of Vesta at Rome has the leaves projecting beyond the shaft, and Inigo Jones has adopted this system in the Banqueting-house at Whitehall. The Corinthian architrave is divided into three faces, the Composite into two. The upper face is surmounted with an astragal and ogee enriched with a fillet · the middle face has above it a small enriched ogee, and the lower face an enriched bead. The frieze is enriched with figures or ornaments. The cornice is distinguished by its modillions and dentils; the latter are supported by an ogee and astragal enriched; the former by an enriched echinus and astragal. The modillion, which is set at intervals under the corona, will be better understood by the annexed view of a modillion of the Temple of Jupiter Stator, showing also the soffit or under-side of the corona, with the enriched pannel between the modillions. The modillions support the corona, which

is terminated with a cymatium, and this moulding, in the example before us, is decorated with lions' heads.



[A Modillion or Console of the cornice of the Temple of Jupiter Stator at Rome.]

In the Composite, mutules are sometimes employed instead of the Corinthian modillion. The orders are sometimes set on pedestals, consisting of a square shaft, called the die, with a moulded base set on a deep plinth. The die is surmounted with mouldings forming a capital, but in reality resembling more the cornice of an entablature. Chambers allows, for the proportion of the die of the Tuscan pedestal, two modules, twenty-four minutes; for the Doric, three modules, six minutes; the Ionic, three modules, eighteen minutes; and the Corinthian and Composite, four modules. The bases and capitals are respectively—Tuscan, base twenty-eight minutes, capital fourteen minutes; Doric, base thirty-two, and capital sixteen minutes; Ionic, base thirty-six, and capital eighteen minutes; and Corinthian, base forty, and capital twenty minutes.

Greek mouldings vary from the Roman, and are remarkable for being almost invariably drawn by the hand, and not formed, as in the Roman examples, of parts of circles struck with the compasses.

The flutings of columns vary in the depth and form of their curves; some, as in the Doric orders, are flat segments, without fillets between them, others are deep segments and semicircles, and others are semi-elliptical, and sometimes more than semi-elliptical, on the plan, as in the Jupiter Stator. Some columns of antiquity are decorated with spiral flutes, and some with leaves, as in the Temple of Clitumnus, and in a fragment in the British Museum, Townley Marbles, room IX.

The method of drawing the entasis of the columns employed in Roman architecture is described by Chambers, p. ii. of the Preface. It is done by means of a sliding rule, called the rule of Nicomedes.

Some account of the entasis of columns, by Mr. Jenkins, is given in the 4th vol. of Stuart's 'Athens,' with comparisons of the entasis of several columns. The Greek entasis is more subtle than the Roman.

We may here observe, generally, that the principle of a base is support, which is admirably shown in the Attic base, where the two tori are proportioned and arranged, with the graceful sweep of the cavetto or hollow moulding between them, to sustain the shaft. The hollow moulding gives additional height to the base, and the profile is in no part within the perpendicular line of the shaft, which would give it a weak appearance. The annexed variety of bases, from Greek examples, present some of the beauties and some of the defects even of Greek architecture. The base of the Apollo Didymæus shows weakness, and the torus of the Minerva Polias, at Priene, appears too heavy for the delicate astragals and cavettos beneath.

Some columns, instead of being fluted the whole height of the shaft, are, for about one-third from the base, made polygonal, each side being the width of the flute. This is particularly the case at Pompeii, where the Doric columns are often very slender. In the internal order of the Pantheon, the flutings are filled with cabling about one-third of their height: Cabling is a carved band projecting out of the fluting.

PROPORTIONS OF SOME OF THE COLUMNS EMPLOYED IN ANCIENT EDIFICES, WITH THE ENTABLATURE.

DORIC.

	Height of Column.	Diameter of Base.	Upper diamet. of Shaft.	Height of Entablature.
	ft. in.	ft. in.	ft. in.	ft. in.
Temple of Jupiter Olympius at Agrigentum	61 9	13 0	10 6	25 9·25
Ditto of Hercules at Agrigentum	33 25	7 0·5	4 10	
Ditto of Apollo Epicurius at Bassæ, near Phigalia	19 6·8	3 7·75	2 10·45	6 5·1
Ditto at Cadachio, in Corfu	11 3 25	2 0	1 6	8 10·75
Ditto of Minerva at Athens, called the Parthenon	31 4·9	6 1·8	4 9·75	10 10·56
Ditto of Theseus	18 7·18	3 3·4	2 6·63	6 5.9
Ditto at Corinth	23 8½	2 5·10	4 4 10	
Doric Portico at Athens (Stuart's 'Athens.')	26 2·5	4 4·05	3 4·6	7 4·58
Trajan's column, Roman Doric	97 9·1	12 2 2	10 8·8	
Antonine column, ditto	97 8·1	13 1·9	12 1·1	
Temple of Jupiter Panhellenius, in Ægina	17 4·25	3 2·6	2 4·65	6 10·05
Ditto of Minerva at Sunium	19 9·15	3 4·3	2 6·65	6 6
Ditto of Jupiter Nemæus between Argos and Corinth	33 11·9	5 2·5	4 3	8 1·85
Propylæa at Eleusis		5 0·4	3 10·98	9 5·15
Temple of Ceres at Eleusis		6 6·27	5 4	12 8·96
Ditto of Diana Propylæa at Eleusis		2 7	2 0·75	5 0·74
Ditto of Nemesis at Rhamnus	13 5·45	2 4·8	1 10	including cymatium

IONIC.

	Height of Column.	Base of Shaft.	Upper diameter of Shaft.	Height of Entablature.
	ft. in.	ft. in.	ft. in.	ft. in.
Temple of Apollo Epicurius at Bassæ		2 1·9	1 9·4	3 9·31
Ditto of Erectheus, Athens	21 7·50	2 3·8	1 11·2	4 11·25
Aqueduct of Hadrian	19 1·95	2 2·35	1 11·1	4 2·90
Temple on the Ilissus	14 8·300	1 9·4	1 6·2	3 7·282
Temple of Fortuna Virilis at Rome	27 0	3 2	2 8	6 8 6 architrave.
Temple of Bacchus at Teos	. .	3 3·6	3 1·8	2 5·4
Minerva Polias at Priene	. .	4 2·8	3 6·4	
Apollo Didymæus near Miletus	. .	6 3·2	5 5·8	3 5·2
Propylæa at Eleusis	. .	3 4·6	2 9·24	

CORINTHIAN.

	Height of Column.	Diameter of Base.	Upper diameter of Shaft.	Height of Entablature.
	ft. in.	ft. in.	ft. in.	ft. in.
Incantada at Salonica	23 8·6	2 5·9		5 7·75
Temple of the Winds (without base)	13 6·85	1 7 4		
Monument of Lysicrates at Athens	11 7·65	1 2	0 11·65	2 8·218
Stoa, or Portico, at Athens	28 0·534	2 11·3	2 6 65	5 6·8
Arch of Trajan, Ancona	23 2·7	2 4·25	2 0·25	5 6·3
Ditto of Constantine	27 4·1	2 11 2	2 9	7 1·2
Portico of Pantheon at Rome	46 5·2	4 10 4	4 3·5	10 11·6
Interior of the Pantheon at Rome	34 10·4	3 8·2	3 2·3	8 2·9
Temple of Antoninus and Faustina	46 7·7	4 10 3	4 2·8	10 9 1
Ditto of Vesta at Tivoli	23 6	2 5	2 1 8	4 3 architrave.
Dito of Jupiter Tonans	46 6·2	4 8·3	3 11·4	10 0
Ditto of Jupiter Stator	48 4·9	4 10 2	4 2·5	12 10·1
Ditto of Vesta at Rome	34 7·2	3 2·5	2 8·1	
Ditto at Jackly, near Mylasa, in Asia Minor, the supposed site of Labranda	27 2·8	2 10·35	2 3·6	5 6·6
Ditto of Mars Ultor at Rome	57 11	nearly 6ft.	5 1·6	3 10·5

COMPOSITE.

	Height of Column.	Diameter of Base.	Upper diameter of Shaft.	Height of Entablature.
	ft. in.	ft. in.	ft. in.	ft. in.
Arch of Titus	20 8·5	2 0 2	1 9·4	5 4·4
Septimius Severus	27 10·6	2 10·6	2 6·5	6 7

Vitruvius makes the height of the Doric (Roman) seven times the diameter; the Ionic, 8½; and the Corinthian, two-thirds higher than the Ionic, or nine diameters and one sixth. The proportions of Palladio and Vignola differ; the latter are, we believe, preferred by the French school. See the Architecture of Palladio and Vignola. The proportions of the columns given above, are from Stuart's 'Athens;' Taylor and Cressy's 'Rome;' 'Ionian Antiquities;' and 'Unedited Antiquities of Attica.'

In studying these works the student should be guided by the figures denoting the dimensions rather than by the outlines.

COLUMN, a body of troops consisting of one battalion or more, drawn up with the several divisions behind one another, so as to present a narrow front to the enemy: it is said to be in close or open order, according to the breadths

of the intervals between the companies or battalions of which it is composed.

The armies of the Greeks and Romans may be said to have been generally formed in columns both for attack and defence. The troops having nothing to fear, in their 'serried' ranks, from a distant artillery, could, by such a disposition, most effectually overwhelm the enemy, or, if on the defensive, resist the shock of his assault: and even after the use of fire-arms was introduced in war, and the successes of Gustavus Adolphus had proved the advantages of a different order of battle, military men with difficulty overcame the prejudices which attached them to the practice of keeping the troops in dense array. The Chevalier Folard, in his 'Traité de la Colonne,' has given at great length every argument that can be urged on behalf of the practice: he compares the column to a moving rampart capable of resisting every effort of the enemy to penetrate through it, and in this respect he considers it far preferable to a hollow square: he compares it also to a torrent hurrying away the enemy by its fearful impetus. He observes besides that it may be deployed and re-formed quickly, and that it can easily accommodate itself to any evolution which may be required. Lastly, he combats the opinion that its order will be destroyed by the effects of the enemy's fire; alleging that while the column is in motion, a distant cannonade is nearly harmless.

Such also are nearly the arguments lately used by Bulow and Jomini in favour of the system of attack by columns. The opinions of these tacticians are strengthened by the general practice of Napoleon, which was to concentrate a great body of troops opposite some one point of an enemy's line, and lead them to the attack. It must not however be forgotten that this method has not always succeeded; according to Rogniat, the defeat of the French at the battle of Esling was caused by the failure of an attack made in that manner against the centre of the Austrian line. In Spain, and on the field of Waterloo, their columns were invariably repelled by the firm resistance opposed to them by the British line of battle.

It is evident however that the advantage of attacking in columns will be great when the force of the enemy is too much diffused, and when his line has been previously disordered by a fire of artillery directed against it; for then a great body of men may be thrown upon a point which is too feeble to resist it, and the line will be penetrated or turned before troops can be brought up from the remoter parts to check the assault. The duke of Wellington appears to have always deployed his columns in line previously to making an attack, and his successes prove the merit of the practice; but it requires great skill in the commander to choose the proper moment for doing it. The deployment should not take place at too great a distance from the enemy's line, since the impediments of the ground may cause that of the assailants to be broken again before it arrives at the place where the charge is to be made; neither should it be postponed till the heads of the columns are very near the enemy, since then the fire of the latter might cause such confusion among the troops as to render them incapable of executing the manœuvre.

The marches of armies are necessarily made in columns, the breadths of which are of course regulated by the nature of the roads along which they are to move. When an army divided into columns has to proceed by different routes into a new position, the number of battalions of which each column is to be composed must be so determined, that all the columns, by arriving at their places on the ground at the same time, may be enabled immediately to form the line of battle.

COLUMNA'RIA. [Madrephylliœa.]

COLUMNI'FERÆ, an old name of Malvaceous plants.

COLURES (*αἱ κόλουροι, colūri*). The term was originally applied to any great circles of the sphere passing through the poles, but came at last to mean only the circles which also pass through the equinoxes and the solstices, which are distinguished as the equinoctial and solstitial colures. These terms are now of very little use, as the fact of a star being upon either circle is attended with no remarkable phenomenon. Astronomers would describe a star on the equinoctial colure as having either no right ascension, or twelve hours of right ascension, according as it is on the vernal or autumnal half of the circle; and a star on the solstitial colure as having either six hours or eighteen hours of right ascension, according as it is on the summer or winter side of the heavens. If we say that the sun is on the equinoctial colure at the quarter days of March and September, and on the solstitial colure at those of June and December, we rather elucidate the term colure than derive information from it.

The solstitial colure passes through the poles of the ecliptic also, and might be called an ecliptic colure; but the other circle, which passes through the equinoxes and the poles of the ecliptic, has no distinct name, and would be best described as the circle from which celestial longitude is reckoned.

COLU'RI. [Salamis.]

COLUTE'A, a Papilionaceous genus of Exogenous plants, consisting of hardy shrubs, with pinnated leaves and inflated membranous pods, which explode when suddenly compressed, and which look like vegetable bladders, whence the common English name of bladder-senna. The species have yellow or yellow and red flowers of some beauty; and are all found either in the South of Europe, in Palestine, and in the mountains of the Himalaya.

COLVILLE, JOHN, of the family of Colville, of East Wemyss, county of Fife, was some time minister of Kilbride, and chantor of Glasgow, of which latter office the church of Kilbride was the appropriate prebend; but disliking the poverty which, on the Reformation, had become incident to the condition of a Scots clergyman, he abandoned that profession about the year 1578, and was in consequence ordered by the General Assembly 'to be taken order withal for deserting of his ministry.' (Melv. *Diary*, p. 50.) He got introduced to court, and the following year we find him attending the Privy Council as Master of Requests. (*Act Parl.* iii. 150.)

He was soon afterwards engaged in the treasonable conspiracy of the Raid of Ruthven, and was on that occasion sent by the party that had seized the king's person as ambassador to queen Elizabeth, who had favoured the enterprize. On the king recovering his liberty, Colville was seized at the instance of Arran, the king's adviser, imprisoned in Edinburgh Castle, and on the 22nd of August, 1584, forfeited in parliament (*Act. Parl.* iii. 334, seq.) His forfeiture however was in all likelihood reversed, and himself restored to royal favour, not long after; for on the 2nd of June, 1587, he was appointed by the king a lord of session in the room of his uncle, Alexander Colville, commendator of Culross, who resigned, 'because through great sickness he could not await and serve the cure of the said senatory.' (*Books of Sed.*) But on the 21st of the same month he gave up the place again in favour of his uncle, and got some appointment, as it seems, in relation to the supply granted by parliament for the king's marriage expenses, part of which was employed by him in purchasing clothes for the king, and other necessaries. (*Moyse*, p. 159.) About the same time also he sat in parliament for the burgh of Stirling. (*Act. Parl.* iii. 524.)

He was probably disappointed in his expectations at court, however, for he soon afterwards joined the turbulent earl of Bothwell in his attack upon the king in December, 1591, for which he was again forfeited in parliament. (*Act. Parl.* iii. 538; Pitc. *Crim. Tr.* i. 2707.) The next year he accompanied the same nobleman to Holyrood House in a new attack upon James. But the party being discovered and defeated, Bothwell was obliged to flee; and Colville, by betraying his associates, obtained a pardon. Bothwell was afterwards excommunicated by the church courts, and not finding himself safe in Scotland, he fled to Orkney, and thence to France, whither Colville also proceeded. The latter several times requested permission of the king to return, and for that end used various arts to ingratiate himself with his majesty. In the year 1600, he published at Edinburgh a treatise entitled 'The Palinode,' which he represented as a refutation of a former treatise of his own against James's title to the English crown, which, 'in malice, in time of his exile, he had penned;' whereas, in fact, no such treatise was ever penned by him. (Spottisw. *Hist.* 457.) All his arts to obtain his recall to his native country proving unsuccessful, he at length professed himself a Roman Catholic, and became a keen writer against the Protestant faith. In 1601 he wrote a 'Parænesis ad Ministros Scotos super sua Conversione,' which was translated and printed at Paris the following year. He wrote also 'Capita Controversa,' and 'De Causa Comitis Bothwelli,' who, like himself, had turned Roman Catholic. Charteris (*Lives of Scots Writers*) mentions another work

of his, 'Oratio Funebris Exequiis Elizabethæ destinata;' and the author of the 'History of Sutherland' speaks of a manuscript left by him touching the affairs of Scotland.

He died while on a pilgrimage to Rome in the year 1607.

COLY'MBIDÆ. [DIVERS.]

COLY'MBUS. [DIVERS.]

COMA, a Greek word (κῶμα) signifying profound sleep; a morbid condition of the brain, attended with loss of sensation and voluntary motion, the patient lying as if in deep sleep.

It can scarcely be considered a primary or idiopathic disease; it is rather symptomatic of that condition of the brain which, when in sufficient intensity, produces apoplexy. If it be regarded as a positive disease, it must be considered as a milder form of apoplexy. It exists in different degrees of intensity; several of which degrees, as they are attended with some variety in the symptoms, and are dependent on some modification of the pathological condition of the brain, so they have acquired distinct names. When there is a state of mental and physical torpor, indicated by an almost constant tendency to sleep, and great inaptitude for muscular exertion; when the patient is sensible only as long as he is strongly excited, and as soon as the external stimulus is withdrawn, lapses into a state of forgetfulness, the affection is called Lethargy. When no distinct consciousness returns, however the patient may be roused or stimulated, though there still remain some indication of feeling on the application of mechanical irritation, as on being pricked or pinched, the affection is called Carus. But when the insensibility is so great that the patient indicates neither sensation nor feeling, whatever mechanical stimulus be applied, this state is often called, by way of eminence, Coma. This comatose state invariably accompanies apoplexy, and, as has been stated, coma, when intense, passes into apoplexy.

The abolition of sensation and voluntary motion (animal functions), which constitutes coma, is always attended with a greater or less disturbance of the organic functions. The circulating system is disordered: the pulse at one time is slow and full, and at another quick and small. The respiration is laborious, and is commonly preternaturally slow. The power of generating animal heat is almost always diminished, the skin being cold and clammy, though there are cases in which the temperature is elevated somewhat above the natural standard. The countenance is usually pale and sunk; the pupils dilated, but in the worst cases contracted; the position of the body is supine; in the worst cases there is a constant tendency to sink down in the bed; the limbs are motionless; and the evacuations, if not wholly retained, which is usually the case, are passed without consciousness.

In coma there is an exhaustion or suppression of the sensorial power; in other words, an abolition of the cerebral functions. This state of the nervous is always attended with a morbid condition of the vascular system. There is either a congestion of the capillary blood-vessels, occasioning obstructed circulation of the blood through the brain, or there is too rapid and violent a flow of blood through the cerebral vessels; or an inflammatory condition of the blood-vessels; or an extravasation of blood, or an effusion of serum into the cerebral substance. In addition to its disordered motion, there is also sometimes a depraved quality of the blood. There is reason to believe that to some morbid change in the constitution of the blood, the coma incident to bad types and advanced states of fever is mainly owing.

The morbid condition of the brain, on which coma depends, may be induced by any of the causes which have been enumerated as constituting the predisposing and exciting causes of apoplexy. [APOPLEXY.]

Coma, which may depend on directly opposite states of the nervous and sanguiferous systems, requires, in different cases, directly opposite modes of treatment. On the discrimination of the exact pathological condition with which, in any given case, coma is connected, and on the adaptation of the remedies employed to that pathological condition, life depends. If coma result from a simple depression or exhaustion of the nervous energy, and be attended with a feeble, irregular, and intermittent pulse, a cold and clammy skin, and a pallid and sunk countenance, the abstraction of the smallest quantity of blood will be certainly fatal. In this modification of the affection, not a depressing, but the very opposite, a stimulating treatment is required. The most appropriate stimulants are those denominated the diffusible, such as ammonia, camphor, &c.; but remedies of this class, whether used externally or internally, or both, must be employed with caution, and their effect watched with vigilance; for the too violent or the too long continued use of them, may actually superinduce a more dangerous form of disease, and convert simply exhaustive into congestive coma. Counter-irritants are almost always safe, and often highly useful; such as blisters to the nape of the neck, or over the scalp, or behind the ears.

When coma depends on congestion of the capillary vessels of the brain; when the pulse is oppressed, irregular, and slow; when the respiration is laborious and slow; when the countenance is tumid, and of a purple or livid colour, local depletions, as by cupping applied between the shoulders, or at the nape of the neck, or by leeches to the temples, counter-irritants, as in the preceding variety, and active purgatives, constitute the most efficient remedies.

When coma depends on the too rapid and violent flow of blood through the cerebral vessels, or on an inflammatory condition of those vessels, indicated by the full and strong pulse, and the hot skin, the same remedies must be employed, but with much greater activity. Life or death depends on the extent to which these remedies are carried, on the decision which sees how far to go, and the discernment which knows when to stop. [APOPLEXY.]

COMA BERENI'CES (Constellation), the hair of Berenice, placed among the stars by the astronomer, Conon, in memory of Berenice, the wife of Ptolemy Euergetes. (B.C. 246.) The legend is, that she had dedicated this hair to Venus, in case of her husband's safe return from Asia, and that it disappeared from the temple in which it was placed, and was never seen again till found in the starry heavens, where it now is, close to the tail of the Lion, and passing the meridian about an hour before Arcturus. [BERENICE.] Geminus attributes the constellation to Callimachus, who mentions it, as do Catullus and Pliny. Ptolemy does not place the stars now belonging to this constellation by themselves, but in the tail of the Lion; and Hyginus makes no separate mention of it. It was constantly mentioned by writers on the sphere, but not figured or catalogued separately, as far as we can find, till the time of Tycho Brahé.

The principal stars are as follows:—

Character.	No. in Catalogue of		Magnitude.	Character.	No. in Catalogue of		Magnitude.
	Flamsteed, Bradley.	Astron. Society.			Flamsteed. Bradley.	Astron. Society.	
	1	1389	7	*k*	23	1451	4
	2	1391	6	*l*	24	1452	5
	4	1402	6		25	1455	6
	5	1403	6	*m*	26	1461	5
	6	1409	5	*n*	27	1474	5
h	7	1410	4½	*o*	29*	1478	6
	8	1414	7		30	1479	6
	10	1416	6	*p*	31	1482	5½
s	11	1419	4½	*q*	35	1486	4½
e	12	1423	5	*r*	36	1493	5
f	13	1425	4½		37	1497	5½
b	14	1428	4½		38	1498	6
c	15	1429	4½	*t*	39	1504	5
a	16	1430	4½		40	1505	6
d	17	1435	6	*u*	41	1507	4½
	18	1436	6	*v*	42	1513	4½
g	21	1442	5	*w*	43	1515	5½
	22	1447	7		[1745]	1508	6

The constellation Coma Berenices will be found shut up in the triangle formed by the three bright stars, Arcturus, β Leonis, and α Canum Venaticorum.

COMA'TULA (zoology), Lamarck, ALECTO, Leach, a genus of radiated animals. Linnæus appears to have confounded the form with the other star-fishes; for it is only noticed by him as a species of his genus Asterias. Neither Gmelin nor Pennant disturbed this arrangement. M. de Fréminville (*Nouv. Bull. des Sciences*,) seems to be the first who formed a genus for it, under the name of *Antedon*. Leach characterized it generically under the name of *Alecto*. Lamarck makes it the first genus of his

* This star has been repeated twice by Flamsteed. It is 36 Virginis (Baily.)

first family (*Les Stellérides*) of his order of *Echinodermatous Radiaria*, placing it immediately before *Euryale*. Cuvier arranges the genus under his *E'chinodermes Pédicellés*; observing, that it is near to the division of the *Euryales* and *Comatulæ*, that the *Encrinites* ought to have their position. Miller is of opinion that *Comatula* presents a conformity of structure with that of the *Pentacrinite* almost perfect in every essential part, excepting that the column is either wanting or reduced to a single plate; and M. de Blainville makes it come under his first section (Free Asterencrinideans) of his third family (Asterencrinideans) of his third order (Stelleredians) of his first class (Cirrhodermarians) of his first type (Actinozoarians) of zoophytes. Mr. Thompson is of opinion that his *Pentacrinus Europæus* is the young of *Comatula*.

M. de Blainville, whose observations appear to be founded on examination of a foreign species preserved in spirit, and on dissection, thus characterizes the genus.

Body orbicular, depressed, membranous; protected above by an assemblage of calcareous pieces, of which one is medio-dorsal, with one or two rows of accessory articulated simple rays, and provided on its circumference with five great rays, deeply bifid and pinnated, commencing with three basilary pieces. *Mouth* rather anterior, isolated, membranous, at the bottom of a star formed by five bifurcated channels. A large pseudo-anal orifice at the fringed extremity of a visceral sac.

The following details of structure are given by the same author. The body of Comatula is almost entirely membranous below; above, on the contrary, it is protected by a sort of *cupule*, which is thick, and composed of calcareous pieces, articulated and held together by a very delicate and hardly distinct skin. This *cupule* is formed by a centro-dorsal part, in which two pieces placed one over the other enter. It is round the first that the auxiliary rays are articulated, and to the second the great rays are joined by means of their basilary part.

The auxiliary rays, whatever may be their number—for they may form one or two rows—are always simple; that is, they are composed of simple articulations joined end to end, of which the last is attenuated and curved into a hook (*fig.* 5). They are never pinnated, and it would appear that they are not provided with any suckers.

The great rays enter by their base into the composition of the cupule or cell in which the visceral mass is contained. Each of them is formed by a simple basilary part, and another much more extended, divided, and pinnated. The basilary part is composed of three joints, a first articulated with the centro-dorsal piece, a second intermediate, and a third terminal, with which the two principal divisions of the rays are joined, and which on that account is shaped into an angle at its summit. The joints of this basilary part not only articulate with each other, but laterally they touch the corresponding parts of the two neighbouring rays. By such a disposition, becoming more and more complex, it is that the heads of *Encrinites* and the genera allied to them are formed. With regard to the pinnated or complex part of the ray, it is at first constantly double, that is, formed of two digitations, which are themselves often subdivided in a variable manner; so that sometimes the comatula bears a resemblance to a great figure of a sun: each subdivision is composed of joints in general but little elongated, which augment but little in number in a given space in proportion as they approach towards the extremity. Their most remarkable points are, that they alternately differ a little in length, and that the longest carry, right and left, on their internal surface, compressed triangular pinnules nearly cirrhous at their extremity, and also composed of a great number of short articulations. The result is, that when the animal is dead the digitation resembles the leaves of the mimosæ, because the pinnules in repose cling one to another like the folioles of sensitive plants throughout the length of the rachis when they are closed. But the principal character which distinguishes the great rays from the accessory ones is, that through the whole length of the axis and pinnules, the buccal or labial channel, fleshy and provided with sucking cirrhi, serving the animal to seize its prey, is continued. In following out these channellings (*espèces de sillons*), the number of which is in proportion to that of the digitations of the ray, we arrive by means of a channel from each, and occupying its base, at the centre of a sort of star with thick fringed borders, and finally at the mouth which is at the bottom. The star formed by the junction of the channels of the rays is not symmetrical, that is, its branches are very unequal; some which we shall call the anterior ones being shorter than the others, or posterior ones. The result is, that the mouth is not at the centre of the star, but much nearer one side than the other: it is difficult to be seen, which is not the case with another orifice which we shall presently discuss, and which M. Lamarck seems to have taken for it. The mouth is deeply buried in the star of the channellings, is round, unarmed, and leads immediately into the stomach. What is remarkable in this last is, that its parietes are thick, and especially that it is not simple. It is in fact full of lacunæ, or rather it forms a sort of cavernous tissue, enveloped on all sides by a yellow granulated matter of some volume, which must be the liver. The result of this disposition of stomach and liver is a considerable visceral mass, which occupies the excavated part of the calcareous cupule, and which is attenuated by degrees as it retires backwards, where it terminates in a soft and obtuse point. All this mass projects in the interior of a large cavity, of which it remains to speak. This cavity entirely membranous—at least below, for above and on the sides it is doubled by the solid parts—surrounds the visceral mass, and detaches it from all the rest of the animal, except towards the mouth, where it is continued. The internal orifice M. de Blainville was unable to discover. It is perfectly smooth, but it is prolonged externally into a sort of bladder (*vessie*), the base of which is behind, and whose truncated summit is forward. This free summit passes even a little beyond the mouth as it advances below it. It is pierced by a large gaping orifice, provided with a circular row of tentaculiform papillæ. 'This,' says M. de Blainville, 'is the part which M. de Lamarck took for the mouth, and which the English authors have considered to be the vent; it is really neither the one nor the other.' He then asks whether it may not be a sort of respiratory or locomotive cavity, or the termination of the ovaries? a question which he is unable to solve, inasmuch as he could not find the organs last named in the only individual which he dissected. 'However that may be,' he adds, 'it is at least easy to perceive, from what has been said of the organization of the *Comatulæ*, that these animals differ considerably from the *Ophiuræ* and other true starfishes; and their habits are different, so far as is known.'

'Probably free wanderers in the seas which they inhabit, it is asserted that they attach, or rather anchor themselves to rocks by means of their accessory rays, using the others, which they extend on all sides, to reach their prey and bring it to the buccal orifice. It is worthy of inquiry, whether the Comatulæ do not make use of the abdominal bladder for the purposes of locomotion, in contracting it on the water, which would penetrate it somewhat after the manner of the Sepiæ.' (*Actinologie.*)

In the 'Descriptive Catalogue of the Museum of the College of Surgeons' (Physiological Series, vol. i.), there is a notice regarding *Alecto Glacialis* (No. 435, A), which imports that the alimentary canal is continued in a spiral direction from the sub-central opening at the convergence of the radiated canals to the opening at the extremity of the fleshy tube which projects forwards by the side of the mouth, forming a second distinct orifice or anus. Mr. Owen at first followed Lamarck in considering this tubular orifice as the mouth; but after dissecting a specimen carefully, and considering the analogy of *Alecto* with the other *Asteriæ*, he regarded it as the superadded orifice, and the sessile orifice at the convergence of the canals or channels as the normal orifice, and consequently the mouth. He is of opinion that this tubular orifice cannot be the opening of the oviducts, because the ovaries are situated in membranous expansions on the inside of the pinnules of the rays, as will be described in another part of the 'Physiological Catalogue.' That the tubular cavity should be a locomotive organ he considers most improbable, to use no stronger term; indeed the animal is so well provided with moveable rays, that such an adaptation would be superfluous; whether or not some respiratory actions are effected by the fleshy tube and receptacle is another question, requiring observation on the currents, &c. while the animal is living, for its solution.

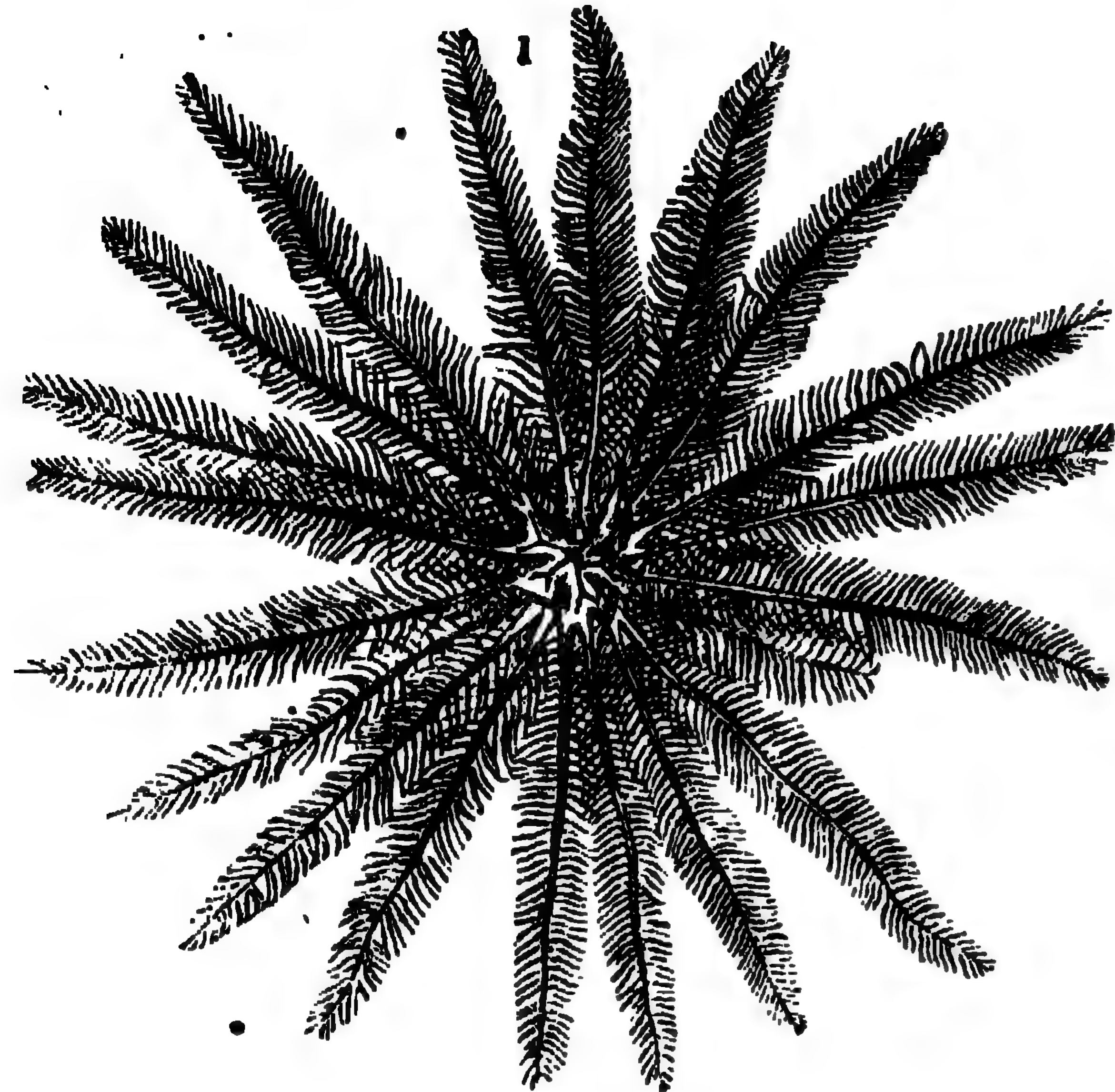
Péron states that these *Radiata* suspend themselves by the small arms from fuci and polyparies, and in that position watch for their prey, which they entrap in their spreading arms.

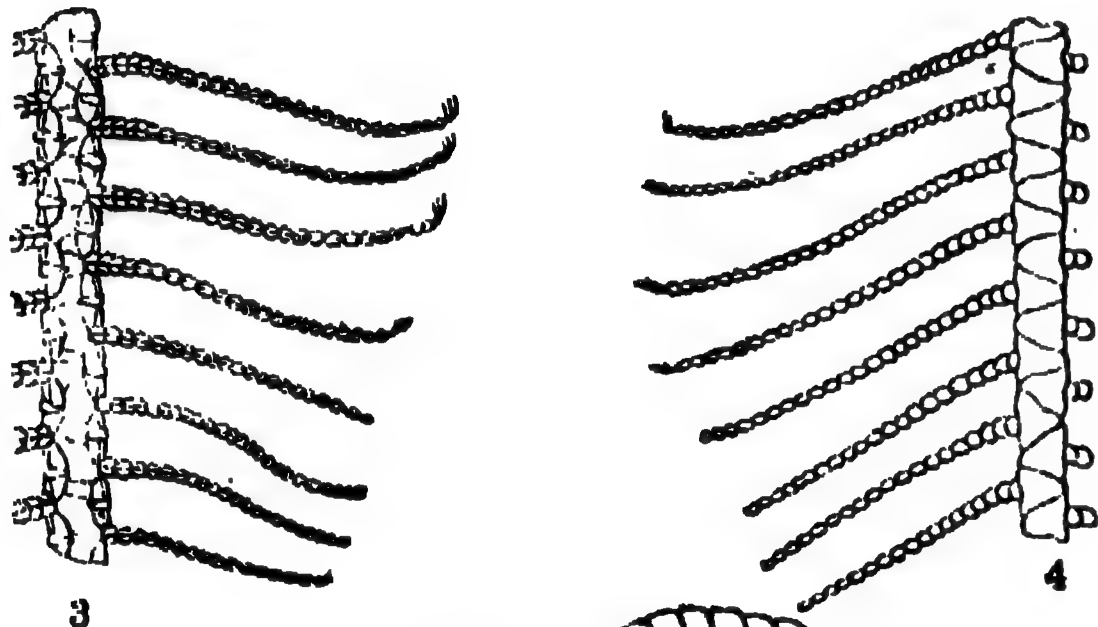
Geographical Distribution. The form is widely distributed: it occurs in our own seas, and in the southern ocean. In the museum of the College of Surgeons are two

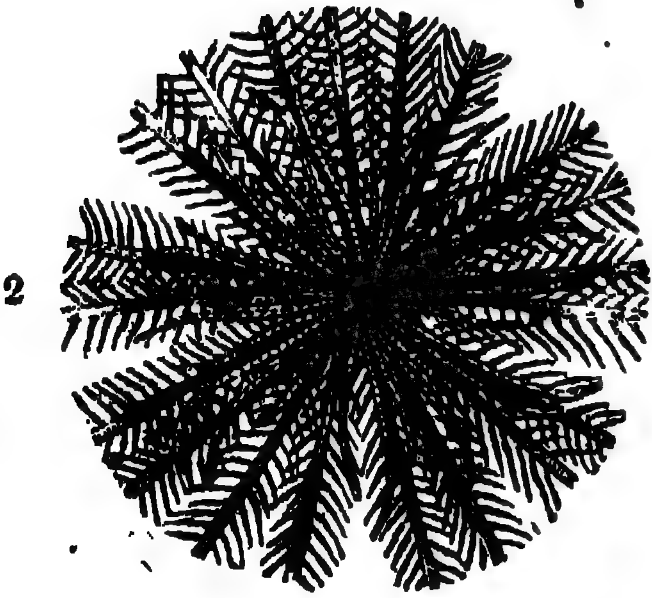
specimens from the Society Isles, one brought up from a depth of 226 fathoms, in lat. 80° 26′ N., long. 12° 30′ E. (H.M.S. *Dorothea*, Captain Buchan, R.N.); and the same species (*Alecto glacialis*) from 250 fathoms, lat. 80° 26′ N., long. 11° 32′ E. (H.M.S. *Trent*, Lieutenant Franklin, R.N.)

The species probably are tolerably numerous. Dr. Leach records three species, two in the British Museum, Lamarck eight, and De Blainville nine.

Example. *Comatula Adeonæ*, Lamarck, who thus describes it. 'Comatula with ten pinnated, slender, penniform







1. Comatula Adeonæ, 3-4ths of the natural size, lower side. 2. Upper side of the same. 3. Part of the under side of a ray magnified. 4. Upper side. 5. One of the dorsal rays magnified, showing the hook or anchor (De Blainville).

rays; pinnules lanceolate, complicatedly canaliculate below; twenty dorsal cirrhi.' *Locality*. The seas of New Holland, where Péron and Lesueur found it hooked on to an Adeona. It is small, delicate, with ten very slender feathery rays, and only three inches in diameter. The pinnules are lanceolated, and folded in two, as it were, below, longitudinally. Many of the species are of comparatively large size; *Alecto horrida*, for example.

Zoologists generally use the term Comatula to express this form. According to the right of priority, Dr. Leach's name Alecto should be retained: Lamouroux has since used the term to designate a genus of fossil *polyparia*. [C[illegible], p. 406.]

FOSSIL COMATULÆ.

Goldfuss enumerates four species from Solenhofen (Oolitic group). (See Schlotheim, Petrefactenkunde, pl xxviii. fig. 1—4): and there is a very doubtful announcement by Defrance, in his tableau, of one from the chalk.

COMBAT, SINGLE. [DUEL.]

COMBINATIONS AND PERMUTATIONS. By the word combination is usually meant any selection which can be made out of a number of different objects without reference to the order in which they are placed: while by a permutation is meant a combination in which different orders of position are to be considered as constituting a specific difference. Thus *abcd*, *acbd*, *dacb*, are all the same combination of four out of the alphabet, but different permutations of four. The investigation of questions relating to combinations, &c., is the principal mathematical part of the theory of probabilities, and was first considered in detail, with reference to that science, by James Bernoulli and Montmort (see 'Library of Useful Knowledge,' *Probability*): but the common rules had previously found their way into arithmetical treatises. The enormous number of different arrangements of which objects are susceptible, even when their number is not large, drew early attention to the subject. We shall give some of the most simple rules, as a help to calculation for high numbers.

I. The number of permutations having x in each, which can be made out of X quantities, is the product of x terms of the series.

$$X, X-1, \quad X-2, \quad X-3, \&c.$$

Thus out of 10 quantities, there are 10 × 9, or 90 permutations of two; 10 × 9 × 8, or 720 permutations of three; 10 × 9 × 8 × 7, or 5040 permutations of four; and so on. Finally, the number of different arrangements which the whole ten will admit of, say the number of changes which can be rung on ten bells, is

$$10.\ 9.\ 8.\ 7.\ 6.\ 5.\ 4.\ 3.\ 2.\ 1. \quad \text{or } 3{,}628{,}800.$$

II. When the whole number of quantities, X, contains a, which are alike of one sort, b, which are alike of another sort, &c., the total number of arrangements of the whole, is not the product of X, X — 1, &c., down to 1, but that product divided by the product of 1, 2, 3. . . , up to a, then by that of 1, 2, 3, . . . up to b, &c. This result can be most easily formed by striking out common factors from the numerators and denominators.

III. In the last case, the number of permutations of x out of X being required, no simple rule can be given, but each case must be solved by itself. For instance, how many permutations of three can be formed out of

$$a \quad a \quad a \quad b \quad b \quad c.$$

(1.) All being different, 3. 2. 1. or 6. (2.) Where a is repeated twice, we have 6. (3.) Where a is repeated three times, one only. (4.) Where b is repeated twice, we have 6. In all, 19.

IV. The number of combinations of x quantities out of X, all different, is

prod. of x terms of X, X — 1, X — 2, &c.
divided by
prod. of x terms of 1, 2, 3, &c.

Thus out of 10 quantities, the number of combinations of four is 10. 9. 8. 7. divided by 1. 2. 3. 4, or 210. The best way of arriving at this result is by destroying common factors, which shows it to be 5. 3. 2. 7. Observe also that we may shorten this process, when x is greater than the half of X, by finding out, not how many selections can be taken, but how many remainders can be left. Thus the number of combinations of 25 out of 30, is the same as the number of combinations of 5, for 25 can only be taken in as many ways as 5 can be left.

V. The number of ways in which n places may be filled up with x letters, allowing any letter to be repeated in all or any of the places, is x^n, or the product of $x, x, x, \ldots$ (n factors in all.)

VI. The total number of combinations of all sorts out of x quantities, from one at a time up to all together, both inclusive, is 2^x, or 2. 2. 2. . . . . (x factors in all) diminished by 1. Thus out of 4 quantities, or less, there are $2^4 - 1$, or 15 different selections: they are

abcd, bcd, acd, abd, abc, ab, ac, ad, bc, bd, cd
a, b, c, d.

Among the curiosities of this subject, it will suffice to mention the following: The number of all possible arrangements of letters, repeated or not, and capable of being pronounced or not, up to words of 24 letters, is of the following order of magnitude. Take a million of millions: repeat it a million of million times: the result is between 1391 and 1392 millions of such numbers. As an instance of the manner in which the dropping of consonants and confusion of vowels may permit possible alterations of spelling, M. de Mairan computed that the word *Hainaut* might be spelt in 2304 different ways, so as to be pronounced in the same way by as many different Frenchmen, or very nearly so.

The most useful proposition in the higher part of the theory of combinations is the reduction of the formula $1.2.3 \ldots (x-1)x$ to a very close approximation, which can be easily calculated by logarithms. It affords, at the same time, a useful lesson to those who have not studied mathematics at all, or very little; we have seen ignorance comfort itself with laughter more than once at the idea of the preceding product being found by employing the proportion which the circumference of a circle bears to its diameter. But let $\pi = 3{\cdot}141593$ be this proportion; $\epsilon = 2{\cdot}718282$, the base of Napier's logarithms· then we have

$$1.2.3 \ldots (x-1)x = \sqrt{2\pi x}\left(\frac{x}{\epsilon}\right)^{x} \text{ very nearly;}$$

which is a little too small, but the error is only about the $12x$-th part of the whole: less than 1 per cent. even when x is so low as 10. The expression can easily be calculated by logarithms Tables of the logarithms of this product will be found at the end of the Article, 'Theory of Probabilities,' in the 'Encyclopædia Metropolitana.' For an instance of the computation, see the 'Library of Useful Knowledge:' 'Examples of Arithmetic,' &c., p. 45.

COMBRAILLES, a district in France, in the former province of Auvergne; it is the north-west part of that province, on the confines of La Marche, and is traversed by the upper waters of the Cher, a tributary of the Loire. It is divided into Combrailles, properly so called, of which the capital is Evaon or Evaux, and Franc-Alleu, of which Sermur is the chief place. Combrailles is now included in the department of Creuse.

COMBRETA'CEÆ, an order of polypetalous exogens, with one-celled inferior fruit, the seeds of which are solitary or nearly so, and pendulous, the stamens definite in number, and the cotyledons convolute. They are tropical shrubs or trees, with alternate or opposite leaves destitute of stipules, and long slender stamens. The order does not contain any plants of much importance for their useful properties. Some of them are astringent and used for tanning, and the kernels of others are eatable; they are chiefly valued for their brightly coloured showy flowers, especially in the genus Combretum



[Combretum coccineum.]
a, flower; *b*, flower opened to show the insertion of the eight stamens; *c*, pistil; *d*, stamen; *e*, fruit; *f*, horizontal section of fruit; *g*, seed; *h*, embryo.

COMBUSTION. [HEAT.]

COMEDY. [DRAMA.]

COME'NIUS, JOHN AMOS, was born in 1592, at Comna, in Moravia, from which place he assumed the name of Comenius. His parents were of the sect of Moravian brethren. After studying at Herborn, near Nassau, he returned to Moravia, and became pastor at Fulneck; but that town being burnt during the religious war then raging, he lost his property, including books and MSS., and took refuge at Lesna, in Poland, where he became rector of a Moravian school. He there published, in 1631, his 'Janua Linguarum,' in Bohemian and Latin. This work established his reputation as a philologist, and was translated into most European and some of the Oriental languages. An edition in Latin, English, and French, was published in London, 1639: 'The gate of Tongues unlocked and opened, or else a Seminary or Seed-plot of all Tongues and Sciences.' It is a sort of encyclopædic phrasebook, in 100 chapters, every chapter being devoted to a separate department of natural history, the arts, or the various professions, sciences, and trades, &c., introducing most of the words belonging to each, and giving by means of the context an explanation of the same. His 'Orbis sensualium pictus, hoc est, omnium fundamentalium in mundo rerum et in vita actionum pictura et nomenclatura,' Latin and German, Nürnberg, 1659, is a vocabulary of technical words, likewise arranged in chapters, but not in connected sentences, each chapter being illustrated by a woodcut representing the objects therein mentioned. These two works resemble each other in principle, but differ in the arrangement. The 'Orbis' also has been often reprinted, and translated into various languages. A Latin and English edition appeared in London, 1777. Comenius was sought after by several governments for the purpose of reforming the system of public instruction. He came to England in 1638, and afterwards went to Sweden in 1642, where he was introduced to the Chancellor Oxenstiern; but he soon after left Sweden and retired to Elbing, where he attended chiefly to the publication of his works. In 1648 he returned to Poland. On the invitation of Prince Ragotzky, he went to Transylvania, where he established a school which he afterwards transferred to Patak, near Tokay. After directing the school for four years, he returned to Lesna in 1654, but was driven away from thence by the ravages of the religious war which continued in Poland. Lesna was burnt by the Catholics, and Comenius again lost his books and MSS. He at last settled at Amsterdam, where he found a protector in Laurence de Geer, who defrayed the expense of the publication of his 'Opera didactica,' fol., 1657, in which Comenius collected several of his works already published separately. The principal of these are: 1st. 'Novissima linguarum methodus,' a sort of universal grammar, with references to the German, Greek, Hebrew, Hungarian, and Turkish languages; 2nd. 'Janua Linguarum novissima Clavis;' 3rd. 'Lexicon januale, seu Sylva Latinæ Linguæ;' 4th. 'Schola Ludus,' which consists of dramatic pieces composed for his pupils at Patak and Lesna, and in which men of various classes and conditions are introduced, each speaking about his own profession or trade, and using the technical words belonging to it. Comenius's didactic works might even now furnish many useful suggestions for a system of elementary popular education. He wrote numerous other works, some historical: 'Historia Ecclesiæ Sclavonicæ,' Amsterdam, 1660; 'Historia Persecutionum Ecclesiæ Bohemiæ,' called also 'Martyrologium Bohemicum,' Berlin, 1763; 'Some Controversies against the Socinians;' 'Antiquitates Moraviæ,' which is still unedited; a Map of Moravia, with names in German and Bohemian, Amsterdam, 1627; 'Prodromus Pansophiæ,' London, 1639, a sort of prospectus of a universal cyclopædia, which was the dream of his life. [illegible] he listened to some fanatics and religious visionaries [illegible] them making a noise, and he seemed [illegible] their revelations. He died at Amsterdam, November, [illegible]

COMET (κομήτης, from κόμη, hair). This term, though no doubt originally derived from the tailed comet of the heavens, yet was at one time pretty generally applied to phenomena of which it may be doubted whether many were anything more than atmospheric meteors. Since the time when observation has shown comets without tails, the following must be considered as the definition of the word:—a heavenly body, of a luminous and nebulous appearance, which approaches to and recedes from the sun, after the manner of a planet in a single revolution. This includes both the comets which return, and revolve in ellipses, and those which, for any thing established to the contrary, may move in hyperbolas or parabolas.

The present is an epoch peculiarly favourable for rejecting the nebulous but *not* luminous mass of surmises, speculations, theories, and analogies, with which a succession of ages has loaded the physical constitution of comets, the question whence they come and whither they go, and every point on which curiosity could be excited. It must be fresh in memory that in the year 1832 *two* predicted comets arrived within telescopic reach, one of which crossed the place where our earth was to be a month after. The public attention was roused almost to a pitch of terror, the result of which was that much was written on the subject, and the facts which had lain unnoticed except by astronomers were drawn forth and made as common as any other fundamental points of the solar system. Still more recent is the appearance of Halley's comet, on which, for different reasons, both astronomers and the rest of the world fixed an almost exclusive attention for months together. With three comets ranking as planets both in theory and practice, we might almost as well enumerate the astrological qualities of a planet, in treating of the elements of its orbit, as reiterate the once prevailing, but now we hope almost exploded, notions about cometary bodies. Without stopping then to ask whether we are to attribute storms, fogs, rain, or the death of princes, to the appearance of a star with a tail—or whether we are to consider it as the vehicle in which departed souls, released from the functions of guardian angels, are transported to heaven;—whether, on the other hand, it is a moral agent of evil, which should be excommunicated by the church;—or whether such a phenomenon ever was the cause of a deluge,—or whether it is a method of reinforcing the light and heat of the sun,—or of creating satellites, or breaking up large planets into smaller ones, or changing the climates of countries, or introducing epidemic disorders—we shall proceed to treat the subject in the same manner as would be advisable in the case of the better known bodies of our system.

A fair average description of the phenomena of a visible comet is as follows:—

A faint luminous circle is discovered by aid of good telescopes; the appearance increases gradually, and after some little time a *nucleus* appears, that is, a part in the middle which is more condensed in its light than the rest, sometimes circular, sometimes oval, sometimes even radiated like a star. The appearance still goes on increasing, the nebula round the nucleus becomes less regular, and a tail begins to form, which looks as if one side of the nucleus were projected in a stream of light away from the body of the comet, which stream grows fainter as it recedes, and finally ceases without any definite boundary. This tail increases in length, so as sometimes to spread across the whole visible heaven: sometimes there are more tails than one, and sometimes the tail seems broken off in parts; it is generally turned directly away from the sun, but this rule is by no means universal. The comet approaches the sun sometimes in an undulating and irregular curve, sometimes nearly in a straight line: it generally crosses the part of the heaven in which the sun is found so near to the latter body as to be lost in its rays; but emerges again on the other side usually with increased brilliancy and length of tail. The phenomena of disappearance are then, in the inverse order, the same as those of its appearance. Frequently it is observed that the dimensions of the comet contract a little as it approaches the sun and dilate as it recedes again.

During such appearances, astronomical observation has always, for the last two centuries, confirmed the hypothesis that the irregularity in the motion of comets arises from their motion combined with that of the earth; and that their real path round the sun is either in a parabola (the infinitely elongated ellipse), or in an ellipse so elongated as to be insensibly different from a parabola within visible limits, or finally in a measurable ellipse, which being an oval curve, ensures the periodic return of the luminary. In fact, the laws under which the orbit is described are precisely the same as those of the planets to the eye of reason, though the elongation of the orbits creates very different visible phenomena. But the stages of discovery were at considerable distances from each other as to time. Aristotle and his contemporaries supposed comets to be igneous vapours formed in the atmosphere. In his 'Meteorologica,' lib. i., he mentions various hypotheses about comets, and describes several remarkable phenomena of the kind. Ptolemy does not mention the word in his Syntaxis; but in his astrological treatise he supposes them to be formed by the motion of the planets. The opinion of Seneca, that comets were a species of planets, was a bold and happy advance upon his age. Even Galileo and Francis Bacon were of the meteoric party; though Tycho Brahé had distinctly shown from observation that his comet [BRAHE, TYCHO] was above the moon in height. Both Tycho and Kepler supposed the orbits to be straight lines. Hevelius (1668) ascertained the concavity of a comet's orbit. Doerfel (1681) is believed to have been the first who laid down the parabolic hypothesis. The *Principia* of Newton confirmed the physical part of this conjecture (in 1687), and the practical part with regard to the comet of 1680. Newton distinctly calls the old planets *planets without tails*. The well-known conjecture of Halley, obtained in 1700 from his calculations of 24 comets, with his prediction, and its subsequent verification, will be treated under HALLEY'S COMET. We may here also observe, that we shall refer the second periodic comet, as to all specific information, to ENCKE'S COMET, annexing the third of the kind (COMET OF BIELA) to this article, from its having been omitted in the proper place. The steps which have been made in positive knowledge of the orbits of comets since Halley are closely connected with the planetary theory, and will be found in articles on that subject. [GRAVITATION, PLANETARY THEORY, &c.]

Resuming the general statistics of cometary orbits, we may observe that up to the year 1665 there are 415 comets recorded: that 46 had been added up to the year 1781, that 80 orbits had been *calculated* in 1792; and that in 1831, 137 orbits had been calculated. But it must be remembered that many of these are returns of the same comet; and that many of the old comets are very doubtful.

Having examined the particular evidence for eight reputed appearances of what afterwards became Halley's comet, we can only find in the case of two as much as would establish the most ordinary historical fact; and when we state that in one instance at least the original authority for the comet lived ten centuries after the appearance, we leave our readers to reduce the number 415 according to their own judgment.

The present average seems to be something more than one comet in each year; of which, however, it is not to be presumed that one in ten is visible to the naked eye.

Of the 137 comets whose orbits were known in 1831, M. Arago made an instructive and curious analysis, which we shall here give.

Number of comets which came to perihelion (nearest point to the sun) in different months.

January .	14	July . .	10
February .	10	August .	8
March . .	8	September	15
April . .	10	October .	11
May . .	9	November	18
June . .	11	December	13

The number in winter is 81; in summer 56. This probably arises from the facility which long nights and feeble sunlight give to the discovery. Of these comets 69 moved *direct* (in the order of the signs of the zodiac) and 68 *retrograde*.

The three following columns show, 1. the number of comets of which the orbits were inclined to the ecliptic between 0° and 10°, 10° and 20°, &c.; 2. the number in which the longitudes of the ascending nodes (points at which they rise above the ecliptic) were between 0° and 30°, &c. 3. the number in which the longitudes of the perihelion were between 0° and 30°, &c.

Inclination.	No.	Node.	No.	Perihelion.	No.
0° to 10°	9	0° to 30°	12	0° to 30°	11
10 ,, 20	13	30 ,, 60	12	30 ,, 60	13
20 ,, 30	10	60 ,, 90	20	60 ,, 90	12
30 ,, 40	17	90 ,, 120	8	90 ,, 120	20
40 ,, 50	14	120 ,, 150	12	120 ,, 150	10
50 ,, 60	23	150 ,, 180	13	150 ,, 180	8
60 ,, 70	17	180 ,, 210	14	180 ,, 210	6
70 ,, 80	19	210 ,, 240	11	210 ,, 240	13
80 ,, 90	15	240 ,, 270	10	240 ,, 270	18
		270 ,, 300	8	270 ,, 300	10
		300 ,, 330	11	300 ,, 330	10
		330 ,, 360	6	330 ,, 360	6

from which it seems that great inclinations are more probable than small ones, that the nodes of comets are pretty equally distributed in the two halves of the ecliptic, but that the perihelia seem inclined to cluster about the summer and winter solstices. Laplace, in applying the theory of probabilities to the subject of the inclinations of the ten planets, which are not altogether as great as any one of them might have been (or 90°), ascertained that it was ten million to one in favour of some specific cause for the inclinations of planets being what they are. But on applying the same analysis to a large number of comets, he was not able to detect as much as three to one for a similar supposition in the case of comets.

With regard to the magnitude of the perihelion distances, it was found that—

Nearer than Mercury	there were	30	comets
Between Mercury and Venus	,,	44	,,
,, Venus ,, Earth	,,	34	,,
,, Earth ,, Mars	,,	23	,,
,, Mars ,, Jupiter	,,	6	,,
Further than Jupiter	,,	0	,,

or the number of perihelia do not by any means increase in proportion to the spheres within which the several planets are contained. If the perihelia were distributed throughout the system as thickly as between the Sun and the orbit of Mercury, there would be three millions and a half of comets within the sphere of Uranus.

With regard to the periodic time of comets there is little to be said, owing to the small number of verified instances. Encke's comet revolves in 3¼ years, Biela's in 6¾ years, Halley's in 75¼ years (roughly): these are the three verified instances. Of predictions remaining for verification we have the following (Airy, *Rep. Brit. Ass.* vol. i.):—

Year of Comet.	Supposed Period.	Authority.
1807	1543 years	Bessel.
1811 (celebrated)	3383 ,,	Bessel.
——— ———	2888 ,,	Argelander.
1815	72-77 ,,	Bessel and others.
1819 (2nd com.)	5½ ,,	Encke.
1819 (4th com.)	3⅞ ,,	Encke.
1812	66-76 ,,	Encke.
1822 (2nd com.)	1550 ,,	Encke.
1822 (3rd com.)	1817 ,,	Rumker.
1825 (4th com.)	556 ,,	Hansen.
1825 (?)	265 ,,	Mossotti?

The short comets of 1819 have not been seen again, but this is not conclusive, as they were excessively feeble, and were very near the earth when observed. It must be remembered that these determinations are not of very high probability, since a determination of the length of the major axis is very uncertain from observations made near the perihelion, and comets are visible at no other time. The time of a revolution, when ascertained by observation, settles the major axis of a comet's orbit very completely: but it is difficult to determine the major axis with sufficient correctness by any other observations.

With regard to our general knowledge of the orbits of comets, we shall only further remark that an instance which might once have led to doubts regarding the universality of the Newtonian principle, has become a striking confirmation of it. We allude to the comet of Lexell, which appeared with brilliancy in 1770, and was most unquestionably (as was found) moving in an elliptic orbit of five and a half years in period. But it has never appeared again. It was found however from theory, that a near approach to Jupiter in 1767 changed an orbit of long period, if not a parabola or hyperbola, then in course of description, into the ellipse just alluded to, and that an orbit of long period was afterwards restored by the action of the same planet; it being easily shown that it would depend on the relative positions of the comet, the sun, and Jupiter, whether the perturbations of the latter would lengthen or shorten the period. This must have appeared a pure hypothesis to all who could not verify the process; it must have seemed that the perturbations of a planet were always ready to explain the disappearance of a predicted comet. But in the meanwhile, more than half a century has gone by; no such comet has appeared again, and it has been proved by the instances of the three verified periodic comets, that the calculated perturbations will enable astronomers to predict with great exactness the actual place in which a comet is to be seen. Consequently, to the appearance of the comets which, if the Newtonian theory be correct, should appear, we may add the disappearance of those which on the same supposition should disappear. But it is hardly necessary now to insist on such a point.

We leave the certain and numerical field of observation of orbits, and proceed to what we know of the constitution of comets. The most interesting question is that of their masses—are they solid, or mere clouds of gaseous matter? Do they derive light from the sun, or are they luminous of themselves? Do they gradually waste away, or do they continue of the same magnitude and intensity of light? These are the only questions which it is worth while to state separately, being the only ones as to which good grounds for conjecture can be given. The question relative to the masses of the comets has been pretty well settled. It may be stated as a certain fact, that though several comets have been placed in situations in which a mass as heavy as a satellite of Jupiter would have produced sensible effects of perturbation, no such effects have been produced. The comet of 1770, had it been only the five-thousandth part of the earth, would have altered the length of our year more than a second of time, which must have been observed again and again before now. The same comet must have passed in 1779 between the satellites of Jupiter: had it been the fiftieth part of one of them in mass it must have affected that system sensibly. The comet of Biela came very near the earth in 1832: not the smallest effect of perturbation has been observed. But the question has been lately brought within still narrower limits. The tail of a comet, supposing it to consist of matter like the gases on our earth (on which supposition every speculation must proceed), is a continual efflux from the body. It is impossible that a permanent atmosphere could be in equilibrium under such a form. The attraction of the body of the comet itself upon such an atmosphere must be exceedingly slight. Again, it is known from the old planets that if space be filled with any fluid, such a fluid must be excessively rare and elastic, or it would show some effect in gradually causing the planets to approach the sun, and shortening their period of rotation. No such acceleration has been observed: not that small accelerations cannot be detected, for that of the moon [LUNAR THEORY] depending on other causes, has been detected, though only amounting to a minute of space in six centuries. Nevertheless, just in the same way as the fall of a feather shows our atmosphere, though that of a bit of lead does not, it may happen that a fluid pervading all space, and so rare as not to affect the planets sensibly for many thousands of years, may soon show itself on such a mass as that of a comet. According to the observations of Encke, the comet which bears his name is gradually shortening its period, at the rate of something less than one day out of 2500, being precisely the sort of effect, and up to this time the only known sort of effect, which could result from a resisting medium. A translation of the memoir of Encke on this subject was published by Professor Airy in 1832, and both the author and translator declare themselves perfectly convinced that the resisting medium is established: M. Arago seems to be of the same opinion, as does M. Poisson. We cannot go such a length; for though we should not be willing to assert a positive conclusion against such authorities, we are obliged to suspend our opinion, either till new observations shall have confirmed the fact, or until some decisive proof shall be given that the probable errors of terms rejected in the approximation to the perturbations are not sufficient to explain the phenomenon. But in the mean time we rest perfectly satisfied that the conclusion is one of considerable probability; and feel inclined to expect that when the comets of Biela and Halley shall be as well known as that of Encke they will confirm the result.

It is most probable that a comet is altogether gaseous, without any solid matter whatever. Stars have been repeatedly seen through the thickest parts. Sir J. Herschel, for instance, in 1832, saw a group of stars of the sixteenth magnitude almost through the centre of Biela's comet. We shall on this subject content ourselves with citing some authorities.

M. Arago.—'I think we should conclude, 1. that there are comets without nuclei; 2. comets of which the nucleus is *perhaps* transparent; 3. comets more brilliant than the planets, of which the nucleus is *probably* solid and opaque.'

Sir J. Herschel.—'Whenever powerful telescopes have been turned on these bodies, they have not failed to dispel the illusion which attributes solidity to that more condensed part of the head, which appears to the naked eye as a nucleus; though it is true that in some a very minute stellar point *has* been seen, indicating the existence of a solid body.'

Mr. Airy.—'On the physical constitution of comets we have learnt nothing, except that they appear to be wholly gaseous.'

We cannot help being convinced that every probability leans towards the truth of the gaseous hypothesis. If this be true, we might as well attempt to ascertain how far a cloud which is driven against a mountain will tend to break off the top, as speculate upon any mechanical danger to the earth from contact with a comet. The effect of such a circumstance would be the mixture of its gaseous material with the atmosphere, a permanent rise (probably) in the mean height of the barometer (though there is no evidence to make it highly probable that all the comets put together would have mass enough to produce a sensible effect of this kind), and, if the gaseous matter should condense sufficiently to descend to the lower regions of our atmosphere, some effect upon animal and vegetable existence, as likely good as bad. For anything rendering the contrary highly probable, the earth may have been many times in the tail (or, as we might say, in the draft) of a comet.

That comets receive their light from the sun is made evident by their alterations of brilliancy. If they shone by their own light, the size would vary with the distance, but not the intrinsic brilliancy. [LIGHT, OPTICS.] But nothing like phases have been observed, except in a very few instances, which are satisfactorily shown to be either doubtful as to the fact, or not such phases as should have been, the position of the sun and earth being considered. This absence of phase is in favour of the supposition of an irregular gaseous mass.

If we take all the recorded accounts, we should certainly be inclined to imagine that the whole system of comets is diminishing in brilliancy and magnitude. But these accounts were written under the bias of terror, and must be considered as most probably exaggerated. It is impossible to see how the waste which arises from the tail can go on without such diminution. The only positive fact however is this, that the comet of Halley, which in 1682 was as round and clear as Jupiter, was not visible to the naked eye in 1759, and in 1836 exhibited a medium brightness, being then in a much more favourable position. The question as to waste is therefore mixed up with others, from which it cannot at present be separated.

The nuclei of comets (so far as observed) have varied from 30 to 3000 miles; the lengths of their tails from nothing up to more than a hundred millions of miles.

The following are references to works which are easily obtained: for those of a more mathematical character, the reader may consult Lalande, *Bibl. Astron.*, and Mr. Airy's *Report Brit. Ass.*, vol. i.; Sir J. Herschel's *Astronomy*, in the Cabinet Cyclopædia; Arago, *des Comètes en général*, troisième édition, Paris, 1834; Pontécoulant, *Notice sur la Comète de Halley*, Paris, 1835; *Companion to the Almanac for* 1833 *and* 1835; *List of Comets*, by Mr. Hussey, *Philosoph. Mag.*, vol, ii.

COMET OF BIELA. In 1805 Gauss found that one of the comets of that year appeared to have a short period of about 1791 days. No prediction was attempted, nor, as it turned out, could have been made successfully. In 1826, February 27-28, M. Biela, an officer residing then at Prague, found a comet which, it seems, 'he had partly expected,' (*Rep. Brit. Ass.* v. i. p. 153); but whether on account of Gauss's determination, we are not informed. It was soon found, however, that this was a repetition of the comet of 1805, and that it had a period of about six years and three quarters, or about 2460 days. Its return was predicted for 1832, and it appeared that the orbit crossed that of the earth about a month before the arrival of the latter at the point of intersection. This annunciation excited much curiosity, and in many quarters considerable excitement, if not positive alarm. We need hardly add that such a feeling was only created among those whose means of information were small: for in truth, the comet in 1836 was always more than fifty millions of miles from the earth, whereas in 1805 it had been within five millions. To this apparition of Biela's comet, we owe a very general desire to obtain information on the subject, and among the fruits of this is the excellent treatise of M. Arago, alluded to in the preceding article.

The comet appeared in September, 1832, according to prediction, and in the part of the heavens assigned to it. Sir J. Herschel describes it as a nebula of 2½′ or 3′ in diameter, of the order of W. Herschel's 'first class.' It had neither tail nor decided nucleus, but only a slight increase of density towards the centre. Very small stars were seen through it. [COMET.]

This body is now a recognized body of the solar system, its next appearance being in 1839. The following, being the elements of the orbit for 1832, is given in Schumacher's *Astronomische Nachrichten*, No. 103. To each element is annexed the effect which could be produced by the discovery of an error in the major semiaxis of the ellipse, amounting to $\Delta a \div 1000$. The perihelion passage is *mean time at Paris*.

Perihelion passage	1832 Nov. 26ᵈ 123066 − ·0009567 Δa
Inclination . . .	13° 13′ 30″·33 + 1″·546 Δa
Long. Asc. Node . .	248 15 11 ·14 + 6″·749 Δa
Dist. of perih. from asc. node on the orbit .	221 45 3 ·96 − 4″·186 Δa
Perih. distance, Earth's distance being 1 .	0·8790808 + ·000008541 Δa
Semi-major axis . .	3·53683 + ·001 Δa

COMET OF ENCKE. [ENCKE'S COMET.]

COMET OF HALLEY. [HALLEY'S COMET.]

COMINES, PHILIPPE DE, Lord of Argenton, was born at the château of Comines, near Menin in Flanders, about 1445. His father was in the service of Philip the Good, Duke of Burgundy, who was also sovereign of Flanders, and Philip himself was early introduced into the court of Charles le Téméraire, Philip's son, whose councillor and favourite he became for a time. When Charles made Louis XI. prisoner at Péronne in 1468, Comines exerted all his influence to calm his master's violent temper; he acted the part of a conciliator between the two princes, and succeeded in bringing about a treaty of peace between them. This timely service was not forgotten by Louis. In 1472 Comines all at once left the service of the Duke of Burgundy, and passed into that of Louis XI., who received him most graciously, and made him his chamberlain and seneschal of Poitou. The reasons for this step on the part of Comines have remained a secret; probably he was tired of Charles's violent temper, and foresaw his impending ruin. Comines married Helène, of the family of the Counts of Monsoreau in Anjou, who brought him as her marriage portion the fiefs of Argenton, Coppoux, Brisson, and others. Comines was employed by Louis XI. in several diplomatic missions to Savoy and other places. After the death of Louis, Comines having joined the party of the Duke of Orleans (afterwards Louis XII.), who aspired to be regent during the minority of Charles VIII., was arrested in 1486 on a charge of treason, and shut up for several months in an iron cage at Loches, and afterwards transferred to Paris. He was at last tried and condemned to banishment, and his property was confiscated, but the sentence was not executed, and the fame of his abilities induced Charles VIII. to employ him in several important negotiations. He accompanied Charles in his Italian campaign, of which he gives a good account in his memoirs. Previous to the return of the king through North Italy, in the midst of the hostile armies of the Italian princes, Comines was sent to Venice to endeavour to detach that state from the league, but he did not succeed. The battle of Fornovo, July, 1495, secured the retreat of the French across the Alps. After his return from Italy, Comines retired to his estates, where he began to write his memoirs. When Louis XII. succeeded to the crown in 1498, Comines repaired to court to pay homage to the new sovereign, for whom he had at one time suffered severe imprisonment and risked his life, but Louis does not seem to have noticed him by any

marks of favour. Comines returned into the country, and he died at Argenton in Poitou, October, 1509, at the age of sixty-four. His body was transferred to Paris, and buried in the Church des Grands Augustins, where Comines had built himself a chapel. His monument has been transferred to the Musée des Monumens Français. He left one daughter, who married a Count of Penthievre.

The memoirs of Comines contain the history of his own times, from the year 1464 to the death of Charles VIII. in 1498. He gives a faithful picture of that singular character Louis XI., whom he greatly extols for his political art. He is also a great admirer of the Venetian government. He was a cool and sagacious observer, and seems to have fully understood the crooked policy of those times. The great value of Comines' Memoirs consists in his frankness and sincerity. He is a matter-of-fact historian; like his contemporary Machiavelli, he paints men and politics such as he found them to be, with all their selfishness, craft, and evil doings, which he relates with great imperturbability. Those historians are the mirror of their age, and what that age was may be conceived by reflecting that Louis XI., Ferdinand of Aragon, the Borgias, Ludovico il Moro, and others of the same stamp, were the contemporaries of Comines. The Memoirs of Comines have been often reprinted, and translated into various languages. The edition by Godefroy and Lenglet du Fresnoy, London, 1747, consists of 4 vols., 4to., of which however the first volume only is occupied by the Memoirs, the other three being filled with numerous historical documents and additions.

COMITIA. Comitium originally signified a place of meeting, as the name imports. Plutarch (*Rom.* xix.) says that the plain where the Romans met the Sabines, in order to agree on the terms of a treaty, was called 'comitium.' The plural 'comitia' denotes general assemblies of the Roman people, convened by the constitutional authority of some magistrate, in order to enact or repeal anything by their suffrages. The comitia were also named 'calata,' from *calare*, to call or convene.

There were three kinds of Roman comitia.

1. *Curiata*, so called because the people met and voted in curiæ. Romulus, it is said, divided the whole Roman people into three tribes, and each tribe into ten curiæ, which were subdivided into decuriæ. The word curiæ is derived from curare, to take care of or superintend civil and religious affairs. Each curia formed a separate community for the celebration of sacred rites, for which purpose a particular priest, called curio, was attached to each curia, and a decurio to each decuria. But all the curiæ were under the superintendence of a curio maximus. A separate place, which was also called curia, was assigned to each curia for performing their sacred rites. The members of a curia were called curiales.

There is some obscurity and doubt about the antient constitution of the curiæ and comitia curiata. However, it seems certain, that the curiæ had the superintendence of sacred matters, that all the public power was united and centralized in the comitia curiata, and that the patrician order must have possessed a great preponderance in them. (See Niebuhr's *Rome*, vol. i., *on the Curies.*) In these comitia laws were made or repealed, capital crimes judged, and the king as well as the other chief magistrates of the state elected. The place of meeting (comitium) was in the forum, and in its northern corner were the rostra. There was no fixed time for the meeting of the curiæ, but they met as business required.

Servius Tullius having instituted the comitia centuriata, and the plebeians becoming powerful through the comitia tributa, the comitia curiata gradually lost almost all political power. However they still passed enactments under the title of leges curiatæ, which, before the institution of the comitia centuriata, denoted every law made by the comitia curiata; but afterwards that term was limited to express a few political rights, still reserved to the latter comitia, particularly that of granting military power (*imperium*) to those magistrates who were elected in the comitia centuriata, which could only confer civil power (*potestas*). Finally, the power of the comitia curiata was reduced to a mere formality, and represented, in Cicero's time, by thirty lictors. Still these comitia retained the privilege of adrogatio, a species of adoption. Though their political power was lost, the curiæ retained their religious functions till the last times of the republic, and always elected the curio maximus and the flamens. Their number was never augmented, as was the case with the tribes.

2. *Centuriata.* Servius Tullius, according to tradition, in order to diminish the power of the patricians, and to elevate the plebeians without giving them any power, made a new division of the Roman people into six classes, which were subdivided into centuries. There has been much dispute about this division and the number of the centuries; and the controversy scarcely admits of decision, as the antient writers (Livius, i. 43, Dionys. Halicarn., *Antiq. Rom.*, i. 19-22, and Cicero, *de Republica*, ii. 22) are of different opinions. But the nature of the institution is not so doubtful. According to the more probable opinion, the 6 classes contained 193 centuries. The first class consisted of 18 centuries of knights and 80 centuries of those (*ditissimi*) whose fortune amounted to at least 100,000 asses; the second class (*ditiores*) contained 22 centuries, and consisted of those who possessed at least 75,000 asses; the third (*divites*) 20 centuries, and consisted of those who had a property of 50,000 asses at least; the fourth class (*mediocres*) 22 centuries, of those who possessed 25,000 asses at least; the fifth class (*modici*) 30 centuries, of those who possessed 12,500 asses; the sixth class contained but one century of capite censi, *i.e.* persons counted by head and not by estates: they were also called proletarii, or ærarii.

According to this division the Roman people met in the comitia centuriata, in order to vote in centuries on public matters; that is, a decree of the assembly was made by counting the votes of the centuries. As the first class alone contained more centuries than all the other classes together, it may be said that, as Romulus had created an aristocracy of birth by his division of curiæ, so Servius Tullius created an aristocracy of fortune by his new division. In order to prevent that disadvantage, when the plebeians had obtained more power, the century, which was to give its suffrages first, was appointed by lot. The century upon which the lot fell was called prærogativa. The other centuries voted according to the order of their classes, and were called jure vocatæ. The decision by lot being regarded as a divine omen, the centuriæ jure vocatæ commonly followed the vote of the centuria prærogativa; and thus the power of the first class was balanced in some measure. A contest however sometimes arose whether a matter was to be decided in the comitia centuriata or tributa.

Every Roman citizen (in the best sense of the word, *civis optimo jure*) had the right of giving his suffrage in the centuries. The magistrates who were competent to call these comitia were the consul, the prætor in the absence of the consul, and the dictator. The magistrate who presided sat on the sella curulis. On holydays (*feriæ*) comitia were not lawful; the days on which they could be held were called dies comitiales. The place of meeting was the Campus Martius. Before the business began the auspices were taken, and if they were not favourable the meeting was deferred to another day; but if no obstacle appeared, the business was opened by reading either the names of the candidates, or the proposition of a law (*rogatio*). Originally they gave their suffrages aloud (*vivâ voce*), but afterwards by tablets, or ballot; which mode of voting was established by the leges tabellariæ, in order to secure the freedom of election. It was not till after a long contest, commenced by the tribune Gabinius, B.C. 140, that the plebeians obtained the protection of the ballot.

As the comitia curiata originally possessed the sovereign power, so, after the time of Servius Tullius, it came into the hands of the comitia centuriata.

In the first place all legislation belonged to these comitia, and the enactments made by them only were called leges (laws), being obligatory upon all the Romans. A *lex* differed both from a decree of the senate (*senatus-consultum*), and from an enactment of the comitia tributa (*plebiscitum*), which only bound the respective estates of the patricians and the plebs. If a law was to be proposed to the comitia centuriata, it was to be promulgated (*promulgata*), that is, notice of it was to be given on three market-days before the day of assembly. The proposed law being accepted by the people, which they expressed by the term 'perferre,' was, after being confirmed by oath of the people, engraved on a public tablet and deposited in the ærarium.

Henceforward all magistrates, both ordinary and extraordinary, were elected at these comitia, as consuls, prætors, censors, decemvirs, and military tribunes. Those who

sought for office appeared in a white toga (*toga candida*, and hence they were called *candidati*) before the people on three previous market-days. The candidate who was elected was proclaimed by the præco, or crier; and if this formality was not observed the election was null. Until the magistrate elected entered upon his office he was called 'designatus.'

The comitia centuriata were also the court of the people (*judicium populi*), for judging public crimes (*crimina publica*) of a grave kind, which were immediately directed against the state or people; as for example, attempts upon the freedom of the people, attempts of individuals to seize on the sovereign power, insult to or the murder of a tribune. Such a crime, which was called crimen perduellionis, was different from the crimen majestatis. (Heinecc., *Antiq.*, iv. 18, 46 and 47.)

3. The *Comitia tributa* were the comitia wherein the Roman people met and voted according to tribes. The plebeians having acquired considerable power in the state, these comitia were established, B.C. 491. Neither birth nor fortune gave advantage in these comitia, as was the case in the other comitia. Every Roman citizen who was classed or registered in a tribe was permitted to vote in these comitia. The place of meeting was not fixed, but the ordinary meeting-place was the Campus Martius; sometimes also the forum or capitol, or Circus Flamininus. The same minute formalities with respect to the auspices were not necessary as at the comitia centuriata. The assemblies were called by a tribune, who also presided, if tribunes or ædiles were to be elected; but at elections of other magistrates, or if laws were to be made, consuls and prætors also might preside.

Soon after these comitia were established, all inferior magistrates, ordinary and extraordinary, were elected in them, as tribunes, ædiles, quæstors, proconsuls, and proprætors; the election of the pontifex maximus, and of various other religious functionaries, was made in these comitia. They also sat in judgment in certain inferior cases; but for capital punishments the comitia centuriata only had competent authority, and the trial of Coriolanus, as the story has come down to us, must be regarded as an anomaly and an illegal act.

It has been already mentioned that enactments made by the comitia tributa were called plebiscita, and at first bound only the plebeians. But as the power of the plebeians became enlarged by degrees, the plebiscita, after many contests between the plebeians and patricians, were made equal in effect to the leges, by the lex Hortensia, B.C. 288. (Gaius, i. 1.) From this time these comitia possessed the complete legislative power, thoroughly independent of the senate. Accordingly enactments for making war or peace, or granting a triumph, were frequently passed against the will of the senate.

In the later times of the republic, the management of the comitia became an important object both for ambitious aspirants to power, and for those who professed to maintain the rights of the people. Cæsar, after being made perpetual dictator, virtually concluded their authority by himself appointing consuls, and naming half of the other magistrates. Finally, the elections of the comitia became a mere formality.

(Sigonius *de Antiq. Jur. Civ. Rom.* i. 17.; Nic. Gruchii, lib. iii. *de Comit. Rom.*, *in Thes. Antiq. Rom.*, ed. Grævius, t. i. p. 531, seq.)

COMMA, in music (κόμμα), is the difference between two sounds whose ratio is 81 : 80; or, the difference between the major tone, C D ($\frac{9}{8}$) and the minor tone, D E ($\frac{10}{9}$). Practically considered, the comma is the ninth part of a major tone. Ptolemy thought so small an interval inappreciable: Salinas asserts the contrary. Maxwell (*Essay on Tune*) agrees with the latter, and gives the following rule for tuning the comma. Obtain G, stopped as the octave to the open fourth string (on the violin), and the difference between that note and the same taken as the greater sixth below the first open string, must be a comma. We refer those who wish to go deeper into this matter to Smith's *Harmonics*. But the clearest and fullest information on the subject is to be obtained from the *Théorie Acoustico-Musicale* of M. Suremain-Missery.

COMMAGE'NE, a small district on the west bank of the Euphrates, between the river and the range of Taurus; it is included by Strabo (Casaub. 749) in the general term Syria. The chief town was Samosata, a fortified place, which contained a royal residence; it was the birthplace of Lucian. The Zeugma, or one of the great passes of the Euphrates, was in Commagene; and on the opposite bank, in Mesopotamia, was the town of Seleuceia, in which Cleopatra, who had the name of Selene or Moon, was besieged by Tigranes, and being taken prisoner, was put to death. When Pompey the Great conquered Syria, he left the little principality of Commagene to Antiochus XIII., the son of Antiochus Eusebes, who died B.C. 58. Antiochus XIV., probably his son, was king of Commagene B.C. 36, at the time of the expedition of Ventidius, the legate of M. Antony, against the Parthians under Pacorus.

COMMANDERY, a species of benefice attached to certain foreign military Orders, usually conferred on knights who had done them some especial service. According to Furetière, these Commanderies were of different kinds and degrees, as the statutes of the different orders directed. The name of Commandery in the order of St. Louis was given to the pension which the king of France formerly assigned to twenty-four commanders of that order, of whom eight received 4000, and sixteen 3000 livres each. The Order of Malta had commanderies of justice, which a knight obtained from long standing; and others of favour, of which the grand master had the power of disposal.

In England, Commanderies were the same amongst the Knights Hospitalars as preceptories had been among the Knights Templars, viz., societies of those knights placed upon some of their estates in the country under the government of a commander, who were allowed proper maintenance out of the revenues under their care, and accounted for the remainder to the grand prior at London. At the dissolution of religious houses, in the time of Henry VIII., there were more than fifty of these commanderies in England, subordinate to the great priory of St. John of Jerusalem. A few of these held productive estates, and had even the appearance of being separate corporations, so much so as to have a common seal; but the greater part were little more than farms or granges. The Templars' term of preceptory was as frequently used to designate these establishments as the term commandery. (Furetière, *Dictionnaire Universel*; Tanner, *Notitia Monastica*, edit. 1787, pref. p. xvii.: Dugdale's *Monasticon Anglicanum*, last edit., vol. vi., pp. 786, 800.)

COMMANDINE, FREDERIC, born in 1509, at Urbino, of a good family, was at first in the service of Clement VII., after whose death he studied medicine at Padua. Unsatisfied with the state of this science, he applied himself to mathematics, and finally settled at Verona as the instructor of the Duke of Urbino and his son. He died there in September, 1575.

This is all that is generally stated as known of Commandino (though there is a life of him by Baldi, which we have never seen), except the evidence which his writings afford that he is to be placed at the head of all the commentators on the mathematics of the Greeks, whether as respects the care which he took to select and print valuable remains, (several of which would probably have been lost but for him) or the knowledge which he displayed in the treatment of difficult and corrupt texts. The list of works which we have collected is as follows. The dates stand at the beginning, and separate the titles.

1558, Venice: the Psammites and Statical Treatise of Archimedes, in Latin, with notes (from a bad text). 1558, Venice: Ptolemy's Planisphere, with commentary, in Latin: in the same book is Jordanus, also with a commentary. 1562, Rome: the Analemma of Ptolemy, with commentary. The original is lost, but a mutilated Latin version was found by Commandine. With this came his own work on Horology, printed at Venice. 1565, Bologna; and Pesaro, 1572: Archimedes on Floating Bodies, with commentary, Latin. 1566, Bologna (and several other editions): Latin version of the four books (then known) of Apollonius, with the lemmas of Pappus, the commentary of Eutocius, and the book of Serenus on the Section of Cones and Cylinders. 1570, Pesaro: the book of Mohammed of Bagdad, on the division of surfaces, which John Dee, who found it, attributed to Euclid, and gave to Commandine. A translation into English, with Commandine's preface, is appended to the second edition of Dee's Euclid, 1660. 1572, Pesaro: Euclid in Latin, fifteen books with scholia, in folio. An Italian version of the books most commonly read, under Commandine's inspection, appeared at Urbino in 1575. 1572, Pesaro: Latin edition of Aristarchus, with notes. [ARISTARCHUS.] 1575, Urbino; and Amsterdam, 1680: the Pneumatics of Hero, with Latin version and notes. 1588, Pesaro; again in 1602; and

Venice, 1589; lastly, at Bologna, 1660, edited by Manolessius: the mathematical collections of Pappus, books 3-8 inclusive, being all which remain, folio. It is sometimes stated that the edition of Pappus appeared in 1558, which is not correct, as Commandine died before the publication, which was superintended by his son-in-law, Valerio Spaccioli, as explained in the preface.

COMMELIN, JEROME, born at Douai, in France, in the sixteenth century, embraced the reformed religion and retired to Geneva, where he carried on the business of a printer. His abilities both as a printer and a scholar, which, in that age, were often united in the same person, attracted the attention of Frederic, Elector Palatine, who invited Commelin to Heidelberg, and made him his librarian.

At Heidelberg he published editions of several Greek and Latin authors, which were valued for their correctness; among others of Eunapius, the text of which he corrected by the MSS. in the Palatine library of Heliodorus, Apollodorus, &c., to which he added critical notes. He also published a handsome edition of 'Rerum Britannicarum Scriptores Vetustiores ac Præcipui,' fol., under the fictitious date of Lyon, 1587, dedicated to Frederic, Elector Palatine. This collection consists of Geoffrey of Monmouth, Pontius Virunnius, Gildas, Bede, Gulielmus Neobrigensis, Froissart, and Buchanan's 'De Jure Regni apud Scotos.' Commelin died in 1598. He has been praised for his accuracy and learning by Scaliger, Casaubon, and De Thou. Another of the same name, and probably of the same family, was a printer at Leyden in the seventeenth century, and published a valuable edition of Virgil, with Servius' Commentaries and numerous notes, 4to., Leyden, 1646.

COMMELINA'CEÆ, a very small order of tripetaloideous endogens, consisting of plants with sheathing leaves, white or most frequently blue flowers enclosed in a green spathe, and a single three-celled ovary terminated by a single style. They are moreover remarkable for their pulley-shaped (or *trochlear*) embryo lying in a particular cavity of the albumen. None of the species are European, nor of any known use. Many of them are common Indian weeds; others are handsome American herbaceous plants. The common Spiderwort is a good type of the order.



[Tradescantia Virginiana.]

a, calyx, stamens, and pistil; *b*, stamen magnified; *c*, jointed hair from the filaments of the stamen; *d*, pistil; *f*, fruit; *g*, horizontal section of the seed-vessel; *h*, *i*, sections of seed; *k*, embryo; *l*, seed germinating.

COMMELINUS, ISAAC, born at Amsterdam, 1598, wrote several historical works in the Dutch language, among others, 'Hollandsch Placaat Boek, or Collection of the Acts of the Government of Holland,' 2 vols. fol., Amsterdam, 1644; also a 'History of the Dutch East India Company,' 4to., 1646; the 'Lives of the Stadthouders William I and Maurice of Nassau,' fol., 1651; and the 'Life of Frederic Henry of Nassau,' which was translated into French: 'Histoire de la Vie et Actes Mémorables de Frédéric Henri de Nassau, Prince d'Orange,' fol., Amsterdam, 1656; which is an interesting historical work. He also collected the materials for a description of Amsterdam, which was published by his son, Caspar Commelyn, 1694, 2 vols. fol., according to Biog. Univ. 'Beschryvinge van Amsterdam, tot den jaare 1691,' fol., 1691, with plates; a second and enlarged edition of which appeared in 1726. It is considered a very good account of that important city.

Isaac died in 1676. His brother, James Commelyn, collected many curious and scarce historical documents concerning Holland, and wrote in French, 'L'Histoire des Troubles, Divisions, et deplorables Calamités des Guerres Civiles survenues dans les 17 Provinces depuis le Commencement du Règne de Philippe II., jusqu' à la Mort de Guillaume, Prince d'Orange,' which remains unedited, as well as his 'Actes et Privilèges des Villes de Delft et Leyden, et de leurs banlieues,' 3 vols. fol.

John Commelyn, son of Isaac, and a senator of Amsterdam, published, in 1697, a work in folio, with very fine plates, of the new plants then growing in the Medical Garden of that city. Caspar, the nephew of John, gave to the world a second volume in 1702, after which he became the author of two volumes in quarto upon similar subjects. At that time the Dutch held in their hands the commerce of the east, and the Commelyns were among the first who made known in Europe the curious plants of the Cape of Good Hope.

COMMENDAM, from 'commenda,' a term of the canon law, which, according to its original signification, was applied where the custody of a void ecclesiastical benefice was, during the avoidance, committed by the bishop or other superior to a person who was to discharge the spiritual duties attached to the benefice without meddling with the profits. The person to whose charge these duties were committed was said to hold the benefice *in commendam*. In process of time, this practice of honorary custody degenerated into an actual perception of the profits, and the device of holding livings *in commendam* was found by the ecclesiastics of the middle ages a useful method of evading the provisions of the canon law against pluralities. [BENEFICE.] By the law of England, no benefice can be held *in commendam* without a licence from the crown. The instance in which this prerogative has been most frequently exercised is where the parson of a parish has been made bishop of a see, the revenues of which were insufficient to support the dignity of the station. The only way to prevent the avoidance of a benefice by promotion to a bishopric, is to grant a licence to retain it *in commendam*. This dispensation is commonly called a *commendam retinere*. (Burn's *Eccles. Law*, tit. Commendam.) It must be obtained before consecration, in case of a person being raised to the episcopal dignity for the first time, or before confirmation, in case of a translation from one see to another. The effect of it, when so obtained, is to preserve the institution, induction, or other means by which the person obtained the benefice, in full force, notwithstanding his promotion. But if the dispensation is not obtained till after consecration or confirmation, it comes too late. There is, however, another kind of dispensation, called a *commendam capere*, which enables a bishop to take a benefice after consecration or confirmation. The consent of the patron of the benefice is essential to the validity of a commendam. Such consent, therefore, must be obtained in due form before a *commendam capere* will be granted, except where the bishop who seeks the commendam, or the king, is patron of the benefice. In the former case, the acceptance of the benefice, in the latter the grant of the commendam, is sufficient evidence of the patron's consent.

In the ordinary case where a *commendam retinere* is required on account of the incumbent being made a bishop, the king is himself patron of the benefice for that time by the promotion, and therefore no other consent than what is implied by the grant of the dispensation is necessary.

Not only dignities and benefices, but headships of colleges and hospitals, may be granted *in commendam*. Several instances of such grants are mentioned by Dr. Burn.

A licence to hold a benefice *in commendam* may be tem-

porary or perpetual. When it is temporary, the precise time is limited in the dispensation. When perpetual, the dispensation expresses that the incumbent shall hold it so long as he shall live and continue bishop of the see to which he is about to be promoted. A temporary dispensation may be renewed or prolonged. If a bishop who holds a benefice *in commendam* is translated to another see, and so a new title accrues to the crown by a new promotion, the avoidance of the benefice may be prevented; but it must be by a new dispensation, giving him permission to hold the benefice *in commendam* with the new bishopric.

By the recent statute 6 and 7 Will. IV., c. 77, sect. 18, it is enacted, that 'no ecclesiastical dignity, office or benefice, shall be held *in commendam* by any bishop, unless he so held the same at the time of passing that act; and that every *commendam* in future granted, whether to retain or to receive, and whether temporary or perpetual, shall be absolutely void to all intents and purposes.'

COMMENSURABLE. Two magnitudes are commensurable which have a common measure. The peculiar part of this subject belongs to [INCOMMENSURABLES, THEORY OF], and [PROPORTION], which see.

COMME'RCIUM EPISTO'LICUM (commerce of letters), a name which was at one time frequently given to published collections of letters, such as were common about the end of the seventeenth century and the beginning of the eighteenth. Thus we have the Commercium Epistolicum of Wallis in the second and third volumes of his works (1693 and 1699), that of Kepler (though his name does not appear in the title-page), published in 1718, and that of John Bernoulli and Leibnitz, published in 1745.

But the name by itself is generally understood to apply to the celebrated collection published by the Royal Society in 1712, in vindication of their decision upon the dispute between Keill and Leibnitz as to the right to the invention of the Differential Calculus, or Method of Fluxions. We have not space here to enter upon the subject-matter of the quarrel itself, but only to give some account of the Commercium Epistolicum, [referring for the rest to NEWTON, LEIBNITZ, FLUXIONS (METHOD OF).]

In the year 1708, Newton and Leibnitz being then both alive, Keill, an astronomer, now better known by his concern in this matter than by his writings or discoveries, inserted in the Philosophical Transactions (No. 317) an article in which he defended Newton against the editors of the Leipsic Acts, who had spoken of Newton's Quadratura Curvarum as a secondary work in comparison of the previous writings of Leibnitz. He asserted that the method of fluxions was first invented by Newton, and that Leibnitz, changing the name and notation, had inserted it in the Leipsic Acts: his words will bear the construction that he conceived Leibnitz to be a plagiarist, but not that of his being an independent inventor. Leibnitz, on the receipt of this volume (March, 1711), complained of the accusation in a letter to Dr. Sloane (then secretary of the Royal Society); reminded him that on a similar accusation having been made a few years before by M. Fatio de Duillier, the Society and Newton himself had disapproved of it; pointed out the dishonourable stigma implied by Keill (whom he presumed innocent of all bad intention), and requested the interference of the Royal Society to induce him to disavow the intention of imputing fraud. Keill (in a letter to Dr. Sloane, May, 1711) denied that he meant to charge Leibnitz with having known the science of Newton by name and notation, but asserted that Newton had explained his Fluxions in two letters to Mr. Oldenburg (then secretary of the Royal Society), which were transmitted to Leibnitz; and that the latter either did draw, or at least could have drawn, the principles of Differentials from thence. On this subject he wrote a long detail of what he considered the proof of his assertion. Leibnitz, in another letter (December, 1711), complains that the charge was now more open than before; that he and his friends had never contested the independent invention of Newton; and that he appealed to the Royal Society and to Newton himself. The Royal Society accordingly appointed a committee, which collected and reported upon a large mass of documents, consisting mostly of letters from and to Newton, Leibnitz, Oldenburg, Wallis, Collins, &c. &c. Their report was to the effect that Leibnitz was in London at the beginning of the year 1673, from which time to September, 1676 (when he visited London before returning to Hanover), he was in correspondence with Collins and Oldenburg: that when first in London, he was in possession of a differential method, which was no other than that of Mouton: and that he never mentioned any other till he wrote a letter of June, 1677, being a year after a copy of Newton's letter to Oldenburg, of December 10, 1672, had been sent to Paris to be communicated to him, and four years after Collins began to communicate the contents of that letter. Also that by a former letter of Newton, of June, 1676, it appeared that he had been in possession of his Fluxions five years before: that Leibnitz's method is in fact the same as that of Newton, with a difference of name and notation: finally, that Newton being the first inventor, Keill, in asserting the same, had been no ways injurious to Leibnitz. This report, preceded by a large mass of letters or extracts, appeared in the year 1712, and again with a Recensio, &c. prefixed, and notes by Keill and others added, in 1725. It was translated into French, and was also published in a journal at the Hague. Leibnitz only protested in private letters against the injustice of the proceeding: he declared that he would not answer a reasoning so weak: and it appears moreover that he had on his mind an impression that the acrimony excited against him in England was political. He was in the service of the Elector of Hanover, the health of the queen was declining, and many of the men of science were Jacobites.

With regard to the Commercium Epistolicum, and the Report attached, it is obvious that the final conclusion was not to the point. The question was not whether Newton was the first inventor, but whether Leibnitz had stolen the method. The committee did not attempt to prove that Leibnitz had received the letter which was sent to Paris to be sent to Hanover; nor do they formally venture to assert their belief that Leibnitz was a plagiarist: but, with a subterfuge wholly unworthy of them, they conclude that because Leibnitz might have seen Newton's letter, &c., which they could not prove, Keill did him no injustice in asserting the priority of Newton's invention—which was not the matter of complaint. Moreover, they published much of their evidence in the form of extract, and their omissions are not always justifiable. It does not appear on the face of the report itself that Leibnitz knew of the appointment of the committee, or had any opportunity of stating any objections he might entertain to its members, or of furnishing any documents relating to the question under consideration. There runs throughout the extracts a desire of proving Leibnitz guilty of more than they meant positively to affirm. The latter acted wisely in appealing to posterity; for though party feeling long adopted the conclusions of the Report in England, it is now nearly, if not quite, the opinion of those who study the matter, that Leibnitz really was an independent inventor.

The part which Newton himself took in the matter at the time is not very well known. In the first edition of the Principia (1687), he stated (book ii., Scolium to Lemma 11) that ten years before (the scolium must probably have been written in 1686 at the very latest) he had communicated *in cipher* a single sentence to Leibnitz as a key to what he informed him was a method of drawing tangents, &c., and that Leibnitz not only wrote in reply, that he had fallen upon a similar method, but actually communicated it, and that he (Newton) found it to be the same as his own, except in notation and symbols. No doubt it was upon the strength of this scolium that Leibnitz confidently appealed to Newton himself: and we might have imagined that the question of the date of this letter would have formed a part of the inquiry. But we cannot find it alluded to: the publication of the Principia is mentioned in its proper place, without a word as to this scolium; nor can we find any allusion to it. We wish we could end here: but we are compelled to add, that this scolium was omitted by Newton in the third edition of the Principia (1725), and its place supplied by another, in which the name of Leibnitz is not mentioned, but an account of what Newton had written to Collins in 1672 begins and ends in nearly the same words. But it must be remembered that between 1687 and 1725 Newton had suffered that illness which perhaps impaired the powers of his mind, and certainly altered his disposition, perhaps even his memory: for in a letter preserved by Raphson, Feb. 26, 1715-16, he gives an account of the letter of Leibnitz differing in several particulars from the printed scolium.

The Commercium Epistolicum will be found complete in Horsley's edition of Newton, accompanied by additional letters extracted from Raphson's 'History of Fluxions,' London, 1715. The appendix contains the additional letters.

COMMERCY. [MEUSE, DEPARTMENT OF.]

COMMINATION (THE OFFICE OF), a service in the Liturgy of the Church of England. It is called 'A Commination, or denunciation of God's anger and judgments against sinners,' from the Latin word *comminatio*, a threatening or cursing. The Protestants at the Reformation introduced the reading of this comminatory service as a substitute for the antient and still continued Catholic ceremony of sprinkling the head, and making the sign of the Cross on the forehead with ashes, on the first day of Lent, hence denominated Ash Wednesday; but though it is ordered especially to be read on this day, the rubric adds, —'and at all other times as the ordinary shall appoint.' From Archbishop Grindall's Visitation Articles, published in 1576, it appears at that time to have been used on four days in the year, namely, on Ash Wednesday and on the third Sunday before Easter, Whitsuntide, and Christmas. The origin and object of the service will be best explained by the following extract from its commencement. 'In the primitive church there was a godly discipline that at the beginning of Lent such persons as stood convicted of notorious sin were put to open penance and punishment in this world, that their souls might be saved in the day of the Lord, and that others, being admonished by their example, might be the more afraid to offend. Instead whereof (until the said discipline may be restored again, which is much to be wished) it is thought good that at this time (Ash Wednesday) should be read the general sentences of God's cursing against impenitent sinners.' The form of the Commination seems to be derived from Deuteronomy xi. 26-30 and xxvii. 1-26, which was afterwards strictly obeyed, as related in Joshua viii. 33-34, in the solemn rehearsal of a series of twelve curses from Mount Ebal by the Levites, with a response to each by the people. See a sermon on the 27th ch. of Deut., entitled 'the Commination Service vindicated,' by the Rev. Benjamin Camfield, 4to., 1680.

COMMINES. [NORD, DEPARTMENT OF.]

COMMINES. [FLANDERS, WEST.]

COMMINGES, a district of Gascogne, which is described in the *Dictionnaire Universel de la France* as being bounded on the north by Armagnac, on the south by the ridges of the Pyrenees which divide France from Spain, on the east by Bas or Lower Languedoc and by the district of Couserans, and on the west by Bigorre and part of Armagnac; but the subdivisions of Gascogne are so indistinctly or so variously laid down in most maps, as to make it difficult to ascertain or describe their true boundaries.

The country was divided formerly into Haut and Bas, or Upper and Lower Comminges, the southern part, towards the Pyrenees, being the Upper.

Comminges is now chiefly included in the department of Haute Garonne; some portions are included in those of Gers, Hautes Pyrénées, and Arriège. Among the towns comprehended in this district are St. Bertrand on the Garonne, and Lombes on the Save, a feeder of the Garonne, both formerly of episcopal rank; St. Girons, on the Salat (population 3634 for the town, 4381 for the whole commune); St. Gaudens, on the Garonne, (population 6179); Muret, on the Garonne, at the junction of the Louge, (population 2330 for the town, 3787 for the whole commune); and Aspet, (population of the commune 5575).

COMMISSION, in military affairs, is the document by which an officer is authorized to perform duty for the service of the state.

Antiently, in this country, the regular mode of assembling the national army, either to resist an invading enemy, or to accompany the king on a foreign expedition, was by sending a royal command to the chief barons and the spiritual lords, that they should meet at a given time and place with their due proportion of men, horses, &c. properly equipped, according to the tenure by which they held their estates; and these *tenants in capite* appear to have appointed by their own authority all their subordinate officers. But commissions were also granted by our kings to individuals, authorizing them to raise men for particular services; thus, in 1442, Henry VI. gave one to the governor of Mantes, by which the latter was appointed to maintain 50 horsemen, 20 men-at-arms on foot, and 210 archers, for the defence of that city. According to Père Daniel, the commission was written on parchment, and, that it might not be counterfeited, the piece was divided, by cutting it irregularly, into two portions, of which, doubtless, each party retained one.

Commissions of array, as they were called, were also issued by the crown, probably from the time of Alfred, for the purpose of mustering and training the inhabitants of the counties in military discipline; and in the reign of Edward III. the parliament enacted that no person trained under these commissions should be compelled to serve out of his own county except in the event of the kingdom being invaded. Of the same nature as these commissions of array was that which, in 1588, when the country was threatened with the Spanish invasion, Queen Elizabeth issued to the justices of the peace in the different counties, authorizing them to muster and train persons to serve during the war. Those magistrates were directed to make choice of officers to command bodies of 100 men and upwards; and such officers, with the consent of the magistrates, were to appoint their own lieutenants. This privilege of granting commissions to the officers of the national militia continued to be exercised by the lords-lieutenants of counties, the king having the power of confirming or annulling the appointments; and it was made law in the reign of Charles II. It appears, however, that before the Revolution, the lieutenants and ensigns were recommended for commissions by the captains of the companies.

In the French service, between the reigns of Francis I. and Louis XIV., we find that the sovereigns reserved to themselves the nomination of the principal commanders only of the legions or regiments, and that the latter were permitted to grant commissions under their own signature and seal to the subordinate officers, who were charged with the duty of raising the troops and instructing them in the use of arms.

In the British regular army, as well as in the navy, all the commissions of officers are signed by the king. In the navy, in the regiment of artillery, and in the corps of engineers and marines, the commissions are conferred without purchase; and to a certain extent this is the case with the commissions granted to officers of the line. Those cadets who have completed a course of military education in the Royal College at Sandhurst are so appointed. In other cases, gentlemen obtain leave to enter the army by the purchase of an ensigncy, the prices of which, in the different classes of troops, are regulated by authority; and they proceed to the higher grades on paying the difference between the price of the grade which they quit and of that which they enter.

The commissioned officers of a battalion of infantry are as follow: Field-officers—colonel, lieutenant-colonel, and major. Regimental officers—captains, lieutenants, and ensigns. Staff-officers—chaplain, adjutant, quarter-master, and surgeon.

For a statement of the prices of, and the fees on, commissions, see the monthly lists.

COMMITTEE, of either house of parliament, may be either of the whole House, or of a certain number of the members selected from the rest. When the House resolves itself into a committee of the whole House, the Speaker in the Commons, or the Lord Chancellor or whoever else is the ordinary Speaker in the Lords, leaves the chair, and the Chairman of Committees, a salaried officer, being one of the members, who is appointed by the House at the commencement of every parliament, takes his place. In the Commons the mace, which usually lies on the table, is at the same time placed under it. In a committee members are not restricted to a single speech on the question under consideration, but each may speak as often as he pleases. Another distinction in the Commons is, that the committee divides by the ayes merely going to the one side of the room, and the noes to the other, instead of one of the two parties going out into the lobby, as in divisions of the House. By the standing orders or established practice of both Houses, there are certain subjects that can only be brought forward in a committee of the whole House. For instance, all measures relating to the church must be so introduced; and in the Commons all propositions for the grant of money for the public service must be first made in such a committee, called a Committee of Supply; and all propositions for raising the money so granted, by taxes or loans, or otherwise, in another committee of the whole House, called a Committee of Ways and Means. No vote of a committee is of any force until it has been reported to the House, and the report received. The Committees of Supply, and of Ways and Means, always meet for the first time immediately after the commencement of the session, and are commonly continued very nearly to its close by leave to sit again being repeatedly granted by the House. Instructions directing, or otherwise to a certain extent controlling, their proceedings, are frequently issued to com-

mittees by the House, to which of course they are bound to attend. All public bills in both Houses are also considered in committees of the whole House, after the second, and before the third reading. Private bills cannot be introduced into either House, until the petitions of the parties interested for leave to bring them in have been referred to select committees; and every such bill is again referred to another select committee after the second reading. The members of select committees are commonly appointed by the open nomination of each, that is, in effect, by the vote of the House; but those of committees for trying contested elections in the House of Commons, are appointed by secret ballot. The investigation of any subject whatever that is brought before parliament may be referred to a Select Committee, and the proceedings of such committees are usually conducted in public; but sometimes a Committee of Secrecy, which takes evidence and deliberates with closed doors, is appointed, when the public safety or other reasons are considered to make that precaution expedient. A committee is generally empowered to summon witnesses, and to call for papers; but no committee of either House can administer an oath. A witness can only be examined on oath at the bar of the House of Lords.

There are some instances in former times of all the members of both Houses meeting together, at the request of one of the Houses, and such a meeting is described as a Committee of the Lords and Commons. What is called a Joint Committee of the two Houses, composed of a certain number of members selected from each, was formerly not unusual. Such a committee very much resembled a free conference; but it was sometimes resorted to after a free conference had failed to bring the two Houses to an agreement. As in the case of a conference, the time and place of meeting of a joint committee were always appointed by the Lords; and the practice was for that House always to appoint only half the number of members appointed by the Commons, a rule which is also observed in the case of a conference. A joint committee had no power to report anything more than the evidence taken by it; but still, as a division might take place on the motion for putting any particular question to a witness, the Lords have latterly considered that they were placed in a disadvantageous position in a meeting so constituted, and on the last two or three occasions on which a joint committee has been thought of the proposition has been given up on that account. In cases in which a joint committee would formerly have been appointed, the method that has of late been taken is for separate committees to be appointed by the two Houses, with power to communicate with each other. The forms at a joint committee made none of those distinctions between the Lords and Commons, which are made by the forms observed at a conference; all the members of the committee were on a perfect equality. (Hatsell's *Precedents* (edit. of 1818), vol. iii., pp. 38-45, 84-86, 169-201, *et alibi*.)

COMMITTEE OF PUBLIC SAFETY, Comité de Salut Publique, the name given to a committee of members of the National Convention, who exercised a dictatorial power in France for about fifteen months, which is known by the name of the Reign of Terror. The National Convention having abolished the royal authority at the end of 1792, and proclaimed the republic, found themselves invested with the whole sovereign power. They delegated the executive part of it to several committees of government, and placed a committee of public safety paramount over all. This committee consisted of ten members of the Convention, appointed for three months, but re-eligible indefinitely: they were commonly called the decemvirs. Their business was to watch over the conduct of the public authorities, and to promote the cause of the revolution. By degrees their powers attained a most extensive range; all the constituted authorities and public functionaries, civil and military, were placed under their immediate inspection. This was after the successful insurrection of the 31st of May, 1793, when the Mountain or terrorist party in the Convention gained the victory, by means of the armed multitudes of Paris, over their fellow-deputies of the Gironde party, who wished to govern the republic according to legal forms, and when the leaders of the Girondins were sent to prison and to the scaffold. From that time, Robespierre and his friends monopolized all the power of the Committee of Public Safety. By a decree of the Convention, 4th of December, 1793, the committee had the right of appointing and removing all the administrative authorities, all the agents and commissioners sent to the departments and to the various armies, and the agents sent to foreign countries. They were to watch and direct public opinion, and denounce all suspected persons. By another decree, of 28th of July, 1793, the Committee was invested with the power of issuing warrants of arrest. There was, besides, another committee, called de Sureté Générale, which has been sometimes confounded with the former, but was subordinate to it, and concerned itself with the internal police and judicial affairs. 'The Committee of Public Safety,' says a witness and a member of the Convention, 'did not manifest its ambition at the outset; it was useful at first. But that prudent conduct ceased after the revolt of the 31st of May, when the Convention, its several committees, and especially that of General Security, fell under the yoke of the Committee of Public Safety, which acted the part of the Council of Ten and of the three inquisitors of the Venetian government. Its power was monstrous, because it was in a manner concealed,—because it veiled its acts amidst the multitude of other committees,—because, by renewing itself perpetually from among men of the same stamp, it took away the responsibility from its members, although its measures were ever the same. The Committee concentrated itself at last in three of its members: Robespierre, who was the real chief, though half-concealed from view, and Couthon and St. Just. There was perfect unanimity among these three down to the moment of their fall; in proportion as the Mountain itself became divided, and its chiefs perished on the scaffold, the alliance between the three became more firmly cemented. There is reason to believe that they had resolved to perpetuate their power by establishing a supreme council of three consuls, in which Robespierre would have had the perpetual presidency, with the departments of justice, exterior, and finance; Couthon that of the interior, and St. Just the war department.' (*Histoire pittoresque de la Convention Nationale*, par un Ex-Conventional, 4 vols. 8vo., Paris, 1833.) The means by which these men contrived to maintain their usurped power are shown by Mignet in his History of the French Revolution. Acting in the name of the National Convention, the Committee were in fact masters of that assembly, which it obliged to adopt its reports and resolutions; it decreed the proscription of any member who resisted its will; it had at its command the armed multitudes of Paris and the suburbs, whose passions and fears it kept constantly excited by suspicions of royalists and traitors; it was supported by the numerous clubs and revolutionary committees distributed all over the country, the poorer members of which received by a decree of the Convention, extorted from that assembly on the 31st of May by the armed mob, an allowance of forty sols a day; and it sent commissioners to the armies, who impeached every general suspected of disaffection, and easily prevailed on the deluded soldiers to give him up. 'It had at its command the law against the suspected passed by the Convention, by which it could arrest any citizen; the revolutionary tribunals which summarily sent the accused to the scaffold; and the decrees of confiscation, forced loans and requisitions, and the maximum upon provisions, by which it disposed of the property of all.' This law of the maximum fixed the highest legal price of provisions and other necessaries, both for wholesale and retail dealers, forbidding them to demand more. (*Tableau du Maximum de la République Française décrété par la Convention Nationale le 6 Ventose, An II.*) The net was so widely spread that it took in all France; and a few obscure men exercised in the name of liberty a tyranny infinitely greater than that of the most arbitrary sovereigns of the old dynasty. In the Convention, from which nominally they derived their power, they were supported by a few bold men, who frightened the rest with the pikes of the mob and with threats of the scaffold. But when these men, Tallion, Barras, and others, discovered that they themselves stood in the way of Robespierre's ambition, and were destined to the common lot of the guillotine, they at once turned upon him and his friends of the Committee, and the majority of the Convention, which had through fear acquiesced in all their measures, immediately sided with them: the National Guards, weary of useless proscriptions, stood by their representatives; and Robespierre and his few friends found themselves alone, without any military man to support them. Even in the Committee of Public Safety, Collot d'Herbois and Billaud Varennes turned against Robespierre. On the 9th Ther-

midor, July 28, 1794, Robespierre, Couthon, and St. Just were executed. From that time the moderate party gradually, though slowly, acquired the ascendency in the Convention.

The most conspicuous members who sat in the Committee of Public Safety, besides the three above mentioned, were Collot d' Herbois, the destroyer of Lyon, Billaud Varennes, Cambon, who had under his inspection the department of finance, Barrere, who was secretary and reporter to the Committee, and Carnot, who occupied himself entirely with the military department, though his signature was affixed to several of the more obnoxious orders and dispatches sent by the Committee. Herault de Sechelles, who had at first a seat in the Committee, was sacrificed by Robespierre together with Danton, whose friend he was. The public accuser, or attorney-general, was Fouquier Tinville, a most strange and repulsive character; a political fanatic, gloomy, merciless, and disinterested, who seemed persuaded that massacre was the duty of a republican. After the fall of Robespierre, Fouquier Tinville was arrested, and tried on the charge of having sent to the scaffold multitudes of men and women of all ages without any legal forms. His trial lasted nineteen days; 400 witnesses were examined for and against him; he was convicted, sentenced, and executed in April, 1795. He died poor: his whole furniture was sold for 20*l.* sterling. At the same time, Barrere, Collot d' Herbois, and Billaud Varennes, although defended by Carnot on the plea of necessity, were sentenced to transportation to Cayenne. A reaction had now taken place in the popular opinion, which pursued the agents of the proscriptions at the bar of the Convention, when their former accomplices being obliged to give them up, endeavoured to throw the whole blame upon them.

Carrier, commissary at Nantes, who invented the Noyades, or wholesale drownings of the suspected in the Loire, and who was himself a member of the Convention, was ordered for trial. He said in his defence that he had only obeyed the orders of the Convention, in conformity with their general spirit, and that the Convention could not condemn him without condemning itself: he concluded by these remarkable words:—'If I am to be punished as guilty, every body and every thing in this hall is guilty, even down to the president's hand-bell.' He was sent however before the revolutionary tribunal, and condemned for having ordered arbitrary executions with a counter-revolutionary spirit; an absurd piece of jargon, characteristic of the times. He was beheaded 16th of December, 1794. There is a very curious memoir concerning Carrier and his trial in the 'Mémoires historiques et littéraires,' by M. de Barante.

COMMODORE (*Comendador*), in the royal navy, is the officer commanding a small number of ships of war, when detached for any particular service from the fleet. His rank is immediately below that of a rear-admiral, and he is classed with a brigadier-general in the army. His ship is distinguished by a red pendant at the mast-head. The title is sometimes given to the senior captain in a fleet of merchant ships.

In the French service, the commander of a detachment of ships is called *Chef d'Escadre;* and in the time of Louis XIII. the commander-general of the fleet was so called when he had not the rank of admiral.

COMMODUS, LUCIUS ÆLIUS AURELIUS, son of Marcus Aurelius and of his wife Faustina, was born A.D. 161. At the age of 16 he accompanied his father in his journey to Syria, which had been disturbed by the revolt of Avidius Cassius. On his return to Rome Commodus obtained his first consulship. He next accompanied his father in his last expedition against the Quadi and the Marcomanni, during which Aurelius died at Vindebona (Vienna), and Commodus became his successor A.D. 180. Having made peace with the northern tribes he returned to Rome, where he enjoyed a triumph. For a short time he appears to have governed with moderation, while several experienced officers, Albinus, Pescennius Niger, Severus, Pertinax, and others, made the name of Rome respected on the frontiers of the empire. Commodus, however, having dismissed the counsellors and friends of his father, gave himself up to the society of freedmen, gladiators, and loose women, with whom he spent his time in debauchery. His elder sister Lucilla conspiring against him with Pompeianus, Quadratus, and other senators, they were all seized and executed. Having put to death his own wife Crispina, Commodus took for his concubine Marcia, a mistress of Quadratus, who seems to have maintained some sort of influence over him till his death. But a succession of unworthy favourites engrossed all political power, and committed every kind of injustice and cruelty. Conspiracy after conspiracy was discovered or invented by them, and a number of the principal senators were put to death, and their property confiscated. The favourites themselves destroyed each other in succession. One of them, Perennis, was put to death with all his family, and was replaced by Cleander, a Phrygian freedman, who put up to sale all the honours and offices of the empire as well as the lives of the citizens. Meantime the legions in Britain mutinied, and Commodus sent Pertinax, who had been exiled by Perennis, to appease the mutiny. In Gaul also a soldier called Maternus collected a numerous band of deserters, but Pescennius Niger being sent against him, Maternus found means to escape with several of his followers, and came secretly to Rome with the intention of killing the emperor, but he was discovered and put to death. A dreadful pestilence afflicted Rome about the same time, which lasted three years, according to Dion. Commodus, to avoid the contagion, retired for a time to Laurentum, where he continued his usual dissolute mode of life. At last a revolt broke out at Rome against the favourite Cleander; the people repulsed the Prætorian cavalry sent against them, and Commodus, to appease the storm, ordered the favourite to be put to death. In the year 191, under the consulate of Apronianus and Bradua, the Temple of Peace, one of the most splendid buildings of Rome, took fire, and vast treasures, as well as collections of books, which were deposited in it, were consumed. The fire spread to the Temple of Vesta, from whence the Vestals ran away to the imperial palace, carrying the Palladium with them. The flames extended to the imperial palace also, and consumed part of it. In the following year Commodus was consul, for the seventh time, with Pertinax, whom he had recalled to Rome. Having had repeated information of Severus aspiring to the empire, Commodus wrote to Albinus in Britain offering him the title of Cæsar, which was refused. [CLAUDIUS ALBINUS.] At the close of his career, Commodus set no bounds to his extravagancies: he disregarded common decency, exhibited himself in the circus and the amphitheatre with the gladiators, dressed himself as Hercules, whose name he assumed, and on one occasion danced naked before the spectators. (Herodian., i. 15.) Being dissuaded by Marcia and some of his officers from degrading himself in public in the company of gladiators, it is said that he wrote down their names for execution, and that the scroll being found by Marcia led to a plot against his life. However this may be, poison was administered to him, and while suffering under its effects, a powerful athleta was sent in, who strangled him, A.D. 192, in his 32nd year and the 13th of his reign. Pertinax, who succeeded him, had his body buried privately, but it was afterwards transferred to the Mausoleum of Hadrian. (Dion, lib. 12, Lampridius, and Herodianus, i. 6—16.)

Commodus had the advantage of a good education and the example of a most virtuous father; he found the empire prosperous after a succession of wise reigns for nearly a century, with a number of able officers civil and military. He left it a prey to confusion, sedition, ill-repressed irruptions of barbarians, the army demoralized, and rival generals disputing for the supreme power. The visible and rapid decline of the Roman empire may be said to date from his reign. The plea of insanity, which is put forth for Caligula's short career of frenzy, cannot be extended to Commodus; his was decidedly a vicious and depraved disposition, which had a full opportunity of displaying itself in the possession of unlimited power.



Coin of Commodus.
(British Museum. Actual size. Bronze. 3?? grains.)

COMMON CHORD, in music. [CHORD.]

COMMON LAW. In its most general signification the expression common law denotes the ordinary law of any country; when used in this sense it is called *common*, as prevailing generally over a whole country, in contradistinction to *particular* laws, the operation of which is confined to a limited district or to a peculiar class of inhabitants. In this manner the phrase is used in many countries which have adopted the civil law. In English jurisprudence the Common Law is that body of customs, rules, and maxims which have acquired their binding power and the force of laws in consequence of long usage, recognised by judicial decision, and not by reason of statutes now extant. The common law is therefore called, in early periods of our legal history, the 'lex et consuetudo Angliæ,' and at the present day the appellation is always used to denote the 'lex non scripta,' in opposition to the 'leges scriptæ,' or statutes. In addition to customs and usages, whose particular origin is unknown, many portions of the common law consist of statutes passed before the time of legal memory, viz., the beginning of the reign of Richard I., and which, though known historically to have been acts of parliament, have no authority as laws in that character, but derive their obligation from immemorial usage, recognised by judicial decision. The provisions of the common law are, however, quite as binding upon the subjects of England as acts of the legislature, being, as already said, impressed with the character of law by force of judicial decisions. In very early times it is probable that the system of rules which composed the common law was wholly traditional. As civilization advanced, the decisions of the king's ordinary courts of justice were carefully recorded, and became the most authoritative evidence of such customs and maxims as formed part of the common law, in precise analogy to the rule of the civil law, that what the emperor had once judicially determined was to serve as a guide in all like cases for the future. (Cod. I., tit. 14. 12.) In addition to the recorded judgments of courts, technically called precedents, the treatises of learned men, such as Bracton, Fleta, Britton, Staundforde's Pleas of the Crown, and Coke's Commentary upon Littleton, are acknowledged as depositories of the common law. Of the whole system the judges of the superior courts are the expositors; they declare the law by applying certain rules and principles to cases which come before them for judgment; but they have no power directly to add to or vary the law.

Learned writers have indulged in much speculation respecting the origin of the common law of England, though Sir Matthew Hale says it is 'as undiscoverable as the head of the Nile.' It seems however to be well ascertained that the customs which in antient times were incorporated with it, were of compound origin, and introduced at various times in conformity with the political vicissitudes of the country; some being Saxon, others Danish, and others Norman. It is also quite evident, from the adoption of the Roman terms of art and several Roman provisions, that many of the rules and maxims which the common law has adopted were derived from the civil law. Again, many parts of the common law have gradually arisen from the necessary modification of its antient doctrines and principles, in order to render them applicable to new states of society produced by enlarged commerce and advancing civilization. From this cause some branches of our system of jurisprudence have wholly sprung into existence in modern times. Thus almost the whole of the law of evidence, now perhaps the most important part of our practical jurisprudence, has appeared as part of the common law so lately as the time of the Commonwealth. But perhaps the most remarkable instance of the total change in common-law institutions with the progressive improvement of society, is the trial by jury, which may be traced through all its gradations, from a rude kind of trial, in which the jury were merely witnesses called from the neighbourhood in order that they might declare the truth to the judge, to the present artificial system, where the jury themselves decide upon the truth of facts by the testimony of witnesses examined before them. On the other hand, many rules and provisions of the common law have wholly disappeared, having either become obsolete from disuse, or been gradually abrogated by decisions of the judges as they became inapplicable to the altered state of society. So great has been the alteration of the common law which these accessions and abstractions have occasioned, that it can scarcely be termed with propriety the same body of laws that it was 600 years ago, unless it be upon the principle upon which Sir M. Hale maintains its identity, viz.: that the changes have been only partial and successive, whilst the general system has been always the same, 'as the Argonaut's ship was the same when it returned home as it was when it went out, though in that long voyage it had successive amendments, and scarce came back with any of its former materials.' (See Hale's *History of the Common Law;* Blackstone's *Commentaries*, vol. i., p. 63; and Reeve's *History of English Law*, vol. i.; Hallam's *Middle Ages*, vol. ii., *on the origin of the Common Law.*)

COMMON MEASURE, any magnitude which is contained an exact number of times in two other magnitudes. Thus in the case of numbers, 7 is a common measure of 56 and 700. The method of finding the greatest common measure is precisely the same both in the science of arithmetic and in that of concrete magnitudes. The proof may be briefly stated as follows: let A and B be two magnitudes, of which B is the less. Let A contain B m times, with a remainder R, or $A = m\,B + R$. Then it is easy to show that every magnitude which measures (or is contained exactly a number of times in) A and B both, measures $m\,B$ and $A - m\,B$ or R; and also that every magnitude which measures B and R measures $m\,B$ and $m\,B + R$ or A. That is, all measures common to dividend and divisor are common to divisor and remainder, and all measures common to divisor and remainder are common to dividend and divisor. Therefore, the greatest of the common measures of either pair is that of the other. Now carry on the division as follows until there is no remainder, which suppose to happen at the fourth step:—

Let $A = m\,B + R$	R is less than B
$B = n\,R + R'$	R' " R
$R = p\,R' + R''$	R'' " R'
$R' = q\,R''$	

Then R'' measuring itself, and also R' or $q\,R''$, must be the greatest measure common to both, for nothing greater than itself can measure R''. But the greatest common measure of R'' and R' has been shown to be that of R' and R, which has been shown to be that of R and B, which has been shown to be that of B and A.

In the case of two numbers or fractions, a common measure must be found; for two whole numbers it must be a whole number, 1 at least, if not higher; for two fractions it must be a fraction. But in concrete magnitudes the process may continue without end, which indicates that the magnitudes are [INCOMMENSURABLES], (which see for proof.) Hence the necessity, in all correct reasoning, of treating concrete magnitudes in the manner laid down in the fifth book of 'Euclid.'

In Algebra the corresponding process does not ascertain the greatest common measure, which depends upon the specific values of the letters; but only the highest common factor, or that which has the highest dimensions. This part of algebra is frequently rendered singularly obscure by the application of the arithmetical word. Thus, though the highest algebraical factor of $a^2 - x^2$ and $a^3 - x^3$ is $a - x$; this last is not the greatest common measure in all cases, as the reader may try by supposing a and x to be 8 and 6.

COMMON PLEAS, COURT OF, a superior court of record, having jurisdiction over England and Wales in all common pleas or civil actions commenced by subject against subject. It is at present composed of five judges, one of them being chief justice and the other four *puisne* justices. All are created by the king's letters patent.

This court has become stationary at Westminster Hall for several centuries. During the existence of the Aula or Curia Regis, established by the Conqueror in the hall of his usual residence, the palace at Westminster, that single tribunal exercised supreme jurisdiction over all temporal causes, which were adjudicated by the principal officers of the royal household, often assisted by persons learned in the law, called the king's justiciars. In this state of things, the poorer class of suitors in the common civil pleas or actions between man and man, in which neither the king's revenue, nor his character of prosecutor of offences on behalf of the public were concerned, laboured under the heavy inconvenience of either attending the frequent and distant progresses of the court, or of losing their remedies altogether. This evil, as well as the jealousy entertained by the crown of the ascendancy of the chief justiciar, who presided over the whole Aula Regis, occasioned the article in Magna Charta, that common pleas should not follow the

king's court, but be held in some certain place. This court thereupon became gradually detached from the Aula Regis, and assumed its present separate form. It has ever since continued its sittings daily during the four terms of each year, without removal from the palace of Westminster or its immediate vicinity, except on a few occasions, in time of plague or contagious disease.

Before the passing of the late statute of 3 & 4 Will. IV., c. 27, this court had an exclusive jurisdiction in all those actions, which, as they concerned the right of freehold or realty, were called real, including as well those on which the common assurances of fines and recoveries passed, as the others which were commenced by the king's original writ out of Chancery. On this account it was styled by Coke the 'lock and key of the common law.' Since the abolition of the great mass of real actions by the above-mentioned act, dower and quare impedit are the only forms of action in which this court has exclusive jurisdiction; for in mixed and personal actions the King's Bench and Exchequer of Pleas have long exercised concurrent power.

In the original constitution of this court, and down to the beginning of the present reign, its proceedings in actions between persons not its officers were founded on original writs issued out of the Court of Chancery, though in process of time they did not actually issue except in cases where it became necessary to perfect the record. But now by a statute (2 Will. IV., c. 39,) introduced by the late Lord Tenterden, to secure the uniformity of process in personal actions in the three superior courts of law, certain forms of process, called writs of summons and capias, are provided as the only means for commencing personal actions in any of those courts, and may be issued from any of them.

Before 1830, the appeal from the judgments of this court was by writ of error to the justices of the King's Bench, a vestige of superiority resulting to the latter as constituting the remnant of that Aula Regis from which this court as well as those of Chancery and Exchequer have been gradually carved out. But now by 11 Geo. IV. & 1 Will. IV., c. 70, the judgments of this court can only be reviewed by the judges of the King's Bench and the barons of the Exchequer forming a court of error in the Exchequer Chamber; the further appeal is by writ of error returnable in the Lords' House of Parliament.

Till recently, the only persons admitted to audience as advocates in this court during its sittings in Term were serjeants-at-law. [SERJEANT-AT-LAW.] But by a royal warrant of his present Majesty, directed to the lord chancellor, in April, 1834, the right of practising, pleading, and audience in his Court of Common Pleas during Term time, was directed to cease to be exercised exclusively by the serjeants-at-law; and other counsel are to have an equal right with them so to practise there. The same warrant conferred on the existing serjeants, not being of counsel for the king, precedence at the bar (according to their seniority among themselves) next to the then junior king's counsel not being a serjeant. Those of the serjeants who had been specially retained for the crown, and were on that account styled king's serjeants, retained their old precedence before all other advocates, except the attorney and solicitor-general for the time being.

The rank of serjeant-at-law being no longer imposed by the crown without the consent or application of the individual, it is apprehended that this most antient and honourable degree will rarely be sought for by the modern barrister, it being lower in rank than the king's serjeants and king's counsel, without conferring a right to exercise exclusive advocacy in any court. It seems however that all persons elevated to the rank of judges of any of the three superior courts must still, as heretofore, be called to the degree of the coif.

COMMON, RIGHTS OF, in law, is the right of taking a *profit* in the land of another in *common* with him, whence the name arises. Such a right enjoyed in exclusion of the owner of the land seems not to be properly common, though belonging to several persons together.

The profits which may be the subjects of common are the natural produce of land (or water, which is included in the legal signification of land); such as grass and herbage, turf, wood, and fish. The commons relating to these subjects are accordingly called common of pasture, turbary, estovers, and piscary. Other things which cannot be called products of land, but rather part of the land itself, as stones and minerals, may also be the subjects of common right. Rights of way and other accommodations in the land of another, though enjoyed in common, do not bear that name, but are called *easements*.

Of all commons, that of pasture is the most frequent. It is the right of taking grass and herbage by the mouths of grazing animals. It differs from that general property, which may exist in the *vesture* or vegetable produce of the land, without any property in the land itself, and which is a corporeal hereditament; whereas all commons are incorporeal, 'as appears,' says Blackstone, 'from their very definition, an incorporeal hereditament being a right issuing out of a thing corporate, or concerning or annexed to the same.' 2 Bl. *Com.*, chap. 3. The same remark applies to other commons, the subjects of which—as for instance woods and mines—may belong as corporeal hereditaments to one, while the land generally belongs to another.

Common of turbary is the right of taking turf for fuel; and common of estovers is the right of taking *wood* for fuel, and for the repairs of houses, fences, and implements of husbandry. These supplies of wood are called fire bote, house bote (which includes the former), plough bote, and hedge or hay bote. These estovers or botes may also be taken by every tenant for life or years from the land which he himself occupies, but they are not then the subjects of *common* rights.

Common of piscary is the right of *fishery* in rivers not navigable; the right of fishing in the sea and in navigable rivers being common to all the subjects of the realm.

The extent of rights of common depends very much upon the *title* to them. There are four titles on which such rights may be founded; common right (which seems to be nearly the same thing as the common law), prescription, custom, and grant.

The title by common right arose with the creation of manors, when land was granted out in fee to be *held* of the grantor as *lord*. As such grants were forbidden by the statute '*quia emptores*' (18 Edw. I., c. 1), it follows that all commons appendant now existing must have been created before the date of that statute. The law allowed to every such grantee, of course, and of common right, common of pasture, turbary, estovers, and piscary in the *waste* of the lord, or that part of his lands which was neither taken by him into his *demesnes* or actual occupation, nor granted out by him to others. These implied rights of common however were allowed no farther than necessity seemed to require, and rights of common thus originating are still confined nearly within their antient limits. Springing from grants of land, they were considered as inseparably *appendant* to the land, so that they could not be severed from it without extinguishment. The common of pasture was confined to the purpose of maintaining, from seed time to harvest, the cattle of the commoner which were used by him in cultivating his land, and which that land would maintain through the winter, or which were, as the law styled it, *levant* and *couchant* upon it. Horses, oxen, kine, and sheep, used either for tilling or manuring land, were the *commonable* cattle. The land to which the common was appendant must have been originally arable, though the subsequent change of arable into meadow, &c. does not extinguish the right. Common of turbary appendant was confined to the purpose of supplying fuel for the domestic use of the tenant; and so strictly must this right be still confined within its antient limits, that it must be appendant to an antient messuage, and no more turves can be taken under it than will be spent in the house. Common of estovers appendant gives, as it gave originally, only the right of taking wood for the repair of antient fences and houses. Common of piscary appendant was only for supplying the tenant's own table with fish, and it must be still limited to this purpose.

Commons claimed by prescription (which supposes a grant) may be as various as grants may be. A right of common thus founded may be either annexed to land (when it is said to be appurtenant), or altogether independent of any property in land, when it is said to be *in gross*. If common of pasture, it may be for any kind of animals, whether commonable or not, as swine and geese. The number of animals may be fixed, or absolutely unlimited, and they need not be the commoner's own.

Common appurtenant may be severed from the land to which it was originally annexed, and then it becomes common in gross

The title to common by custom is peculiar to copyholders and may also give the commoner various modifications of right.

Right of common of pasture may also be claimed because *of vicinage*, or neighbourhood. This is where two wastes belonging to different lords of manors adjoin each other, without being separated by a fence. The cattle lawfully put upon the one common may then stray, or rather are excused for straying, into the other.

The rights of the owner of the soil over which a right of common exists, are all such rights as flow from ownership, and are not inconsistent with the commoner's rights.

Rights of common are conveyed, like all other incorporeal hereditaments, by deed of grant. When they are annexed to land, they will pass with the land by any assurance adapted to transfer the latter.

Rights of common are liable to be extinguished in several ways, and often contrary to the intentions of parties. It is a rule, that if the owner of common appurtenant purchases *any part* of the land over which the right extends, the right of common is *altogether* extinguished; it is the same if he release his right over any part of the land. This unreasonable rule however does not extend to common *appendant*, though that will be extinguished if the commoner becomes the owner of *all* the land in which he has common, and partial extinguishment of the common will follow from acquisition of part of the land. The enfranchisement of a copyhold to which a right of common is annexed extinguishes the right.

The most common mode of extinguishing rights of common in modern times is by inclosure under act of parliament. (See INCLOSURE; also generally on this subject Woolrych, on 'Rights of Common'; Comyn's *Digest*, tit. 'Common'; and Blackstone's *Commentaries*, book ii., chap. 3.)

COMMON, TENANCY IN, is one of the modes in which property may be held by several persons together. It comes the nearest to separate ownership, from which it differs in little else than that the shares held in common are not actually divided or marked out. As to alienation, transmission by descent, and other incidents of property, the law of undivided and of divided shares is the same. From the blending, however, of the shares, there necessarily arises some peculiarity in the mode of their enjoyment. When the profits of the thing held in common are partible (as corn growing in a field), they are generally actually divided among the tenants, and then the property of each most closely resembles separate property. It frequently happens, however, that this cannot be done; in which case the thing held in common must either be used alternately by the tenants (as a horse), or they must join in using it, as tenants in common of an advowson are required by law to concur in presenting to the church.

The shares of tenants in common may be either equal or unequal, and the quantity of their interests may be either equal or unequal. All may be tenants in fee, tenants for a term, &c., or one may be tenant in fee, and another tenant for a term, &c. It is necessary, however, that the possession of all be contemporaneous: successive interests are not a tenancy in common.

A tenancy in common may be created in several ways. If a joint-tenant, or coparcener, aliens his share to a stranger, the latter is a tenant in common with the remaining joint tenant or coparcener. If the sole owner of property aliens an undivided part of it, and retains the rest, the grantor and grantee are tenants in common. As to the words which, in a transfer of property to two or more persons, create a tenancy in common, or a joint-tenancy, many nice distinctions exist in the law. At common law, a conveyance of land to two simply, and without other words, made them joint-tenants, and not tenants in common; except in a few particular cases. (Litt., 283, 284.) This rule of law was founded on the feudal policy, which favoured the mode of holding property in joint-tenancy rather than in tenancy in common, because the former afforded room for the re-union of the property by survivorship (which is the characteristic incident of joint-tenancy) in a single individual, who might more effectually perform the duties belonging to the feudal tenure than several persons among whom the same burden was divided; and it is probable therefore that in the times of feudalism the intentions of grantors were fulfilled by implying joint-tenancy rather than tenancy in common. For a long time past however the courts have endeavoured, whenever they could, to raise by construction tenancies in common rather than joint-tenancies. But a tenancy in common might always be created by express words, and no technical expressions being necessary for the purpose, the courts have been enabled to lay hold of any words in a deed or will which appeared to them sufficiently expressive of a tenancy in common, in order to establish one. The misfortune however is that they have assumed greater latitude in this respect in the construction of wills and uses and trusts, than in the construction of common-law conveyances; so that the same words, as for instance the words 'equally to be divided,' often have different effects in different instruments.

The Courts of Equity have decided that in certain cases a simple conveyance to two or more makes them in equity tenants in common, and not joint-tenants, unless there is an express declaration to the contrary. This is the rule where a mortgage is made to two or more, and when an estate purchased by two or more is conveyed to them in unequal shares. This doctrine is sometimes in practice found very inconvenient.

A tenancy in common ceases as a matter of course, when the ownership of the several shares exists in a single individual: it can also be destroyed by partition made by the tenants. Any one of the tenants may compel the others, by suit in equity, to make partition of lands or houses held in common, except when the subject is in its nature not partible, as in the case of a living animal for instance.

Notwithstanding its many inconveniences, tenancy in common often occurs, being frequently created by wills and settlements in which property is given by suitable words to classes of persons together, as to children, or to a number of individuals by name.

COMMONS are wastes and pastures which have never been exclusively appropriated by any individual, but used in common by the inhabitants of a parish or district. Where extensive common rights exist, the mode of cultivating the inclosed land is greatly affected by it. All the cattle being maintained on the commons for a great part of the year, less land is laid down to grass, and only so much is kept in meadow as will produce hay to feed the cattle in winter weather, and when the commons will not sustain them. The consequence is, that the arable land is not well cultivated, little manure is made in the yards, and the rent is paid by the stock which runs on the commons, and which increases and grows without any expense to the owner. But it is a wasteful disposition of the land. Common pastures are never improved; no one will drain or clear them of weeds, still less manure them. The stock kept upon them is not by any means so numerous as could be kept on the same surface divided and improved. Hence most of the commons and common fields in Great Britain have been divided and inclosed within the last forty years. Wherever an inclosure has taken place the public has gained, even when the individuals immediately connected with the land may have suffered some loss, by not receiving an equivalent for the profit they had from the cattle which they contrived to keep on the commons.

The soil of commons within a manor belongs to the lord: if there is no manor, it belongs to the king. The herbage belongs in general to the tenants and other inhabitants of the manor or districts, according to fixed rules. Where commons are very extensive there is sometimes no restriction on the number of cattle which may be turned out on them. This is called *common without stint*.

The usual proportion given to the lord for his right in the soil on an inclosure is one-sixteenth. The remainder is divided among those who have a right of common in proportion to the land they possess, and on which their right depends.

Common fields differ from commons, in that they are divided for the purpose of cultivation; but as soon as the crop is off the ground, the cattle of all the proprietors, or of all the parishioners, as the custom may be, have a right of pasture over the whole in common. This system is incompatible with an improved husbandry, and common fields have been very generally divided and inclosed by particular acts of parliament. A late act greatly facilitates these inclosures, and will no doubt soon convert every remaining common field into enclosed farms.

COMMONS, HOUSE OF. The object of this article is to present a distinct though compendious view of the history and actual state of the House of Commons as a part of the Imperial Parliament of Great Britain and Ire-

land. In tracing the history of the English borough system, we have shown the origin of this house in the union of the assembled representatives of the cities and boroughs with those of the counties. It should be borne in mind that the original basis of the representation, in the time of Edward I., was very different from what we must suppose it would have been made, had the crown and its advisers at that period contemplated in this arrangement any such thing as the composition of a legislative assembly. The very large proportion of the whole number of its members that were sent from the towns, at a period when the population and general importance of the towns, as compared with those of the counties at large, were vastly less than they are now, was manifestly a circumstance repugnant to all the political notions and tendencies of the government of that day. It will be seen, on inspecting the subjoined table, that under Edward I. the town representatives bore so large a proportion to those of the shires as 246 to 74; and under Edward III. as 282 to 74. The reason why, on the first settling of the representative system into regularity and permanency, each constituency was uniformly summoned to elect *two* members, without regard to its known or presumed proportion of wealth or populousness, seems to have been very simple and very natural. So long as the parliamentary voice of the commons was confined to matters of taxation merely, the only thing that appears to have been seriously regarded in fixing the number of delegates was the securing such a delegation from each constituency as at the smallest inconvenience and expense to the latter should have full power to treat of the pecuniary business in question; and *two*, being the smallest number compatible with the important conditions of mutual consultation and joint testimony, was fixed upon as the number that imposed the smallest burden on the constituents, and was also most convenient for avoiding a too crowded assemblage of representatives. And thus it seems to have been that the periodical and frequent shire and borough courts presenting the most natural and convenient modes and occasions of appointing the parliamentary deputies of the several communities, two representatives, and two only, were summoned indifferently from the shire as from the borough, and from the largest shire or borough as from the smallest.

When the power and authority of the commons in parliament had become so firmly consolidated under the first three Edwards as to exercise an effective control over all the great measures of government, the composition of the representative body was an object of constant attention and solicitude to the crown. As the number and names of the counties entitled to send members admitted neither of doubt nor of dispute, the right of the *boroughs* became the first object of attack from that quarter. We have shown elsewhere how the attempts of this nature, made through the arbitrary exercise of the presumed power of the sheriff to select or omit boroughs, were defeated by parliamentary enactment of the 5th of Richard II.; as, in like manner, statutes were passed in the three following reigns to restrain the corrupt and irregular proceedings of the sheriffs both in county and in borough elections.

Hitherto, however, the parliamentary determinations of the commons, as regarded the constitution of their own house, had constantly tended to maintain the political rights of their constituents against invasion on the part of the crown. But that firm and lasting establishment of their own power as a distinct legislative body, which may be dated from the great revolution that first brought the house of Lancaster to the throne, seems, by that very additional security which it gave them against royal encroachment, to have tended to embolden the house, not, as formerly, to maintain the elective franchise to the utmost with the same zeal with which they upheld their own interest and independence as a legislative chamber, but to commence a sort of reaction against the constituent bodies by narrowing the basis of the suffrage itself. The earliest of these disfranchising enactments, and one of the most remarkable, is that of the 8th Henry VI., restricting the county franchise, formerly possessed by all freeholders, to such only whose freeholds were worth clear forty shillings a year, a sum at least equal to twenty pounds of the present day. The next remarkable instance, though very different in its nature, of legislative enactment respecting the constitution of the commons' house, appears in the parliamentary incorporation of Wales and Cheshire in the reign of Henry VIII. (noticed more particularly in our account of the boroughs of England and Wales), which brought an accession of sixteen county and fifteen borough members.

The *borough* representation in general was still the great object of attention to the crown in undermining the independence of the House of Commons. Under the appropriate title we have traced at length the development of that part of its policy, as diligently pursued under the later reigns of the Tudors, and carried to the utmost limit by the Stuarts; 1st, by creating or reviving parliamentary boroughs, and at the same time remoulding their municipal constitutions according to the views of the court; 2nd, by proceeding to assimilate the municipal constitutions of the old parliamentary boroughs to those of this newly-created class. Here again we refer the reader to the subjoined list, and would particularly direct his attention to the fact, that of the 46 parliamentary boroughs first created in the reigns of Edward VI., Mary, and Elizabeth, no fewer than 27 appear in schedule (A) of the Reform Act of 1832, besides five of the same number which are in schedule (B): a very clear indication as to the description of places which were chiefly selected at that period to exercise for the first time the parliamentary franchise. In the same place we have shown that the last addition to the English representation, previous to the recent changes, was, under Charles II., the enfranchisement by statute of the county and city of Durham, and the creation by charter of the parliamentary borough of Newark. Nor must we forget to mention that James I., by virtue of his royal prerogative, had conferred the right of electing two members upon each of the two universities of Oxford and Cambridge, quite independently of the city and borough representation of those places already existing: thus introducing an anomaly, as well as novelty, into the representative system, a sort of forced alliance between learning and politics, emanating from the peculiar mental constitution and training of that prince.

Those who conducted the revolution of 1688 made much more effectual provision against the return of Roman Catholic ascendency than they did for the purification of the representative system. The Bill of Rights does, indeed, express, 'that the election of members of parliament ought to be free;' but this vague declaration seems to have amounted to nothing more than an indication of the prevailing public opinion on the subject. We find another strong proof that the public attention had now begun to be directed, not merely, as in former times, to upholding the authority of the Commons' House as constituted in parliament, but to the nature of the relations, on the one hand between the house and the constituent body of the nation, on the other between the several members and their individual constituencies, in the enacting of the statute commonly called 'the Triennial Act,' which deprived the crown of the power of continuing the same House of Commons for a longer period than three years. The Triennial Act of 6 and 7 William and Mary, c. 2, was an enactment wholly on the side of electoral freedom. The discretionary power previously exercised by the crown, not only of dissolving, but of continuing at pleasure, was highly favourable to any such view, on the part of the crown, as that of forming a tacit compact with a corrupt or servile majority of the Commons' House, and was therefore, as had been lately seen under Charles II., exceedingly convenient both to king and commons, when the latter happened to be sufficiently pliant. So strongly however was the popular opinion on this point expressed at the period in question, that it compelled the commons to persist in the measure in spite of King William's refusal of assent to the bill after its first passing the two houses, so that on the second occasion his assent was reluctantly yielded. The same activity of the public opinion of that day respecting the composition of the commons, produced the several Acts of that reign which disqualify various classes of placemen for seats in the house.

In this place we must notice the legislative union with Scotland, effected in 1707 by statute 6 Anne, c. 8, only to mention that it brought an accession to the English (which thereby became the British) House of Commons, of thirty members for counties, and exactly half that number for cities and boroughs; exhibiting between the numerical amount of the county and that of the borough representation a proportion quite the reverse, not only of that which existed in England, but of that which had previously appeared in the Scottish parliamentary representation.

The same reign presents us with an enactment of the

British House of Commons respecting its own future constitution, totally different in character from those of William III.'s time just referred to. This is the very important Act (9 Anne, c. 5), which established the qualification of landed property for English members, whether for counties or boroughs. In the reign of Henry VI., which gave birth to the enactment disfranchising the smaller county freeholders, was passed an Act, in the same spirit, restricting the choice of those freeholders who still retained the franchise. The very terms of this statute imply, that in the case of the counties as in that of the boroughs, there was originally no legal distinction between the qualification of the electors and that of the elected, but that the former were simply called upon to return two of their own number according to their own best discretion. The circumstance, too, of the daily expenses uniformly paid under legal obligation by the constituents to each representative while absent on parliamentary duty, may in this place be properly mentioned as a striking evidence of the fact, that the qualification of considerable property, how much soever it might be regarded in the judgment of the constituents, was, originally, not at all contemplated by the law. The statute in question (23 Henry VI., c. 14) declares, that thenceforward the county representatives shall be 'notable knights of the same counties, or shall be able to be knights,' that is, shall have freehold to the amount of 40*l* per annum, and that no man shall be eligible 'that stands in the degree of a yeoman or under.' On this legal footing the county representation remained until the ninth year of Queen Anne, when not only was the landed property qualification re-enacted for the counties on a scale nearly proportioned to the decrease in the nominal value of money, but an unprecedented step was taken, by including in the very same clause of the same Act a provision, that while every knight of the shire should possess a freehold or copyhold estate of clear 600*l*. per annum, so also every citizen, burgess, or baron of the Cinque Ports should have the like landed qualification to the amount of 300*l*. per annum. The statute of the 1st of George I., commonly called the Septennial Act, which extended the legal duration of parliaments from three years to seven, how cogent soever might be the political motives of the chief promoters of the measure, is another memorable instance of the lengths to which the House of Commons could now venture in dealing in a wholesale manner with the elective rights of its constituents.

After all that royal prerogative and parliamentary enactment had now done to undermine the originally free and independent basis of the national representation in general, little more seemed necessary in order to render the subversion of this part of the legislative constitution complete; and the door was permanently shut against the prosecution of any scheme for reforming or improving the constitution of the Commons' House, originating within that assembly. It would require volumes to describe the operation and effects of this great political machine during the period that followed—the period of its most absolute perversion to ministerial and to party purposes, and at the same time to trace the fearful and fluctuating conflict thus excited and protracted between the vitiated constitution of the house and the growing strength and intelligence of public opinion. It is no matter of conjecture; it is a momentous and significant fact in the history of this great political institution, that it was 'the pressure from without,' and that alone, forcibly stimulated, indeed, by the recent success of a popular revolution of government in a neighbouring country, that drove the House of Commons to compel, first the formation of a ministry pledged to amend the constitution of the representative body in general, and secondly, by adopting and perseveringly supporting the measure of amelioration consequently brought forward, to force the acquiescence of the hereditary chamber of the legislature in this degree of purification of the representative.

One of the most important operations of the British House of Commons during the period above mentioned, was the enacting of the statute, passed in 1800 and taking effect from January 1st, 1801, by which it incorporated the parliamentary representation of Ireland with that of Great Britain. For the previous history of the Anglo-Irish representation, and the degree of alteration made in it by the Act of Union, we refer to [PARLIAMENT OF IRELAND]. Sixty-four members for counties, thirty-five for cities and boroughs, and one for Dublin university, were thus added to the number of the British House of Commons. In this instance, as in that of the Scottish union, the antient proportion between the city and borough representation was reversed, and an additional weight consequently thrown into the scale of the county representation of the United Kingdom at large.

We now proceed to exhibit, in one general view, the state of the representative system of the United Kingdom as now existing, showing, at the same time, under each of the appropriate heads, the nature and extent of the several important changes made by the Reform Acts of 1832. The following tabular form, to which reference is made in the subsequent paragraphs, will be found, on comparing it with the historical summary given under BOROUGHS OF ENGLAND AND WALES, to afford, besides the convenience of chronological and alphabetical arrangement, some interesting and useful illustration of the progress of the English borough system. In considering this table we must observe, that in stating the counties and boroughs as sending members continuously from the several reigns in which they respectively began to send, we have been obliged, for the sake of brevity and clearness, to abstain from distinguishing some of the boroughs, and, we believe, two or three of the northern counties, which, for reasons given above, and in our account of the boroughs of England and Wales, occasionally omitted sending in some of the earlier reigns. Nor could we conveniently specify such boroughs as, having once sent members, discontinued electing a long time ago, and have never since resumed their parliamentary existence. The most important as well as interesting object in exhibiting such a view, has appeared to us to be the showing the several epochs of English representative history that respectively gave birth to the parliamentary constituencies which subsisted at the introduction of the Reform Bill in 1831.

Parliamentary Representation of the United Kingdom, before the Reform Acts of 1832.

COUNTIES.

ENGLAND AND WALES.

[Continuous from the reign of Edward I.]

	Counties	Members.		Counties.	Members.
	Bedfordshire	2	F	Staffordshire	2
F 2	Berkshire	2	F	Suffolk	2
F 2	Buckinghamshire	2	F	Surrey	2
F 2	Cambridgeshire	2	F	Sussex	2
F	Cornwall	2	F	Warwickshire	2
F	Cumberland	2		Westmorland	2
F	Derbyshire	2	F	Wiltshire	2
F	Devonshire	2	F	Worcestershire	2
F 2	Dorsetshire	2		Yorkshire (2 added in 1821*)	4
F	Essex	2			
F	Gloucestershire	2		[From Henry VIII.]	
F	Hampshire	2		Anglesey	1
F 2	Herefordshire	2		Brecknockshire	1
F 2	Hertfordshire	2		Cardiganshire	1
	Huntingdonshire	2		Carmarthenshire	1
F	Kent	2		Carnarvonshire	1
F	Lancashire	2	F	Cheshire	2
F	Leicestershire	2		Denbighshire	1
	Lincolnshire	2		Flintshire	1
	Middlesex	2		Glamorganshire	1
F	Norfolk	2		Merionethshire	1
F	Northamptonshire	2		Monmouthshire	2
F	Northumberland	2		Montgomeryshire	1
F	Nottinghamshire	2		Pembrokeshire	1
F 2	Oxfordshire	2		Radnorshire	1
	Rutlandshire	2			
F	Shropshire	2		[From Charles II.]	
F	Somersetshire	2	F	Durham	2

* Transferred from the Cornish borough of Grampound, disfranchised for *too* flagrant bribery.

SCOTLAND.

In the British Parliament, from the Union under Anne.

Counties.	Members.	Counties.	Members
Aberdeen	1	Linlithgow	1
Argyle	1	Orkney and Shetland	1
Ayr	1	Peebles	1
Banff	1	Perth	1
Berwick	1	Renfrew	1
Dumbarton	1	Ross	1
Dumfries	1	Roxburgh	1
Edinburgh	1	Selkirk	1
Elgin	1	Stirling	1
Fife	1	Sutherland	1
Forfar	1	Wigton	1
Haddington	1	Bute and Caithness, alternately	1
Inverness	1	Clackmannan and Kinross, alternately	1
Kincardine	1	Cromarty and Nairn, alternately	1
Kirkcudbright	1		
Lanark	1		

IRELAND.

In the Imperial Parliament, from the Union under George III.

Counties.	Members.	Counties.	Members.
Antrim	2	Clare	2
Armagh	2	Cork	2
Carlow	2	Donegal	2
Cavan	2	Down	2

Counties.	Members.	Counties.	Members.
Dublin	2	Mayo	2
Fermanagh	2	Meath	2
Galway	2	Monaghan	2
Kerry	2	Queen's County	2
Kildare	2	Roscommon	2
Kilkenny	2	Sligo	2
King's County	2	Tipperary	2
Leitrim	2	Tyrone	2
Limerick	2	Waterford	2
Londonderry	2	Westmeath	2
Longford	2	Wexford	2
Louth	2	Wicklow	2

CITIES AND BOROUGHS.

England and Wales.

[Continuous from the reign of Edward I.]

City or Borough.	County wherein situated.	Members.
A Amersham	(Bucks)	2
Andover	(Hants)	2
A Appleby	(Westmorland)	2
B Arundel	(Sussex)	2
B Ashburton	(Devon)	2
Barnstaple	(Devon)	2
Bath	(Somerset)	2
Bedford	(Bedfordshire)	2
A Bedwin	(Wilts)	2
Beverley	(Yorkshire)	2
A Blechingley	(Surrey)	2
Bodmin	(Cornwall)	2
A Bramber	(Sussex)	2
Bridgenorth	(Shropshire)	2
Bridgewater	(Somerset)	2
Bridport	(Dorset)	2
Bristol	(co. of itself, locally between Gloucestershire and Somerset)	2
Bury St. Edmund's	(Suffolk)	2
B Calne	(Wilts)	2
Cambridge	(Cambridgeshire)	2
Canterbury	(co. of itself, locally in Kent)	2
Carlisle	(Cumberland)	2
Chichester	(Sussex)	2
Chippenham	(Wilts)	2
Cockermouth	(Cumberland)	2
Colchester	(Essex)	2
Coventry	(co. of itself, locally in Warwickshire)	9
Cricklade	(Wilts)	2
B Dartmouth	(Devon)	2
Derby	(Derbyshire)	2
Devizes	(Wilts)	2
Dorchester	(Dorset)	2
A Downton	(Wilts)	2
B Droitwich	(Worcestershire)	2
A Dunwich	(Suffolk)	2
Evesham	(Worcestershire)	2
Exeter	(co. of itself, locally in Devon)	2
Gloucester	(co. of itself, locally in Gloucestershire)	2
Great Marlow	(Bucks)	2
B Grimsby	(Lincolnshire)	2
Guildford	(Surrey)	2
A Hedon	(Yorkshire)	2
B Helston	(Cornwall)	2
Hereford	(Herefordshire)	2
Hertford	(Hertfordshire)	2
Honiton	(Devon)	2
B Horsham	(Sussex)	2
Huntingdon	(Huntingdonsh.)	2
A Ilchester	(Somerset)	2
Ipswich	(Suffolk)	2
Lancaster	(Lancashire)	2
B Launceston	(Cornwall)	2
Leicester	(Leicestershire)	2
Leominster	(Herefordshire)	2
Lewes	(Sussex)	2
Lichfield	(co. of itself, locally in Staffordshire)	2
Lincoln	(co. of itself, locally in Lincolnshire)	2
B Liskeard	(Cornwall)	2
Liverpool	(Lancashire)	2
London	(co. of itself, locally in Middlesex)	4
A Lostwithiel	(Cornwall)	2
A Ludgershall	(Wilts)	2
B Lyme-Regis	(Dorset)	2
Lynn	(Norfolk)	2
B Malmesbury	(Wilts)	2
Malton	(Yorkshire)	2
Marlborough	(Wilts)	2
A Milborne Port	(Somerset)	2
Newcastle-upon-Tyne	(co. of itself, locally in Northumberland)	2
Newport	(Hants)	2
New Sarum, or Salisbury,	(Wilts)	2
B Northallerton	(Yorkshire)	2
Northampton	(Northamptonsh.)	2
Norwich	(co. of itself, locally in Norfolk)	2
Nottingham	(co. of itself, locally in Nottinghamshire)	2
A Okehampton	(Devon)	2
A Old Sarum	(Wilts)	2
A Orford	(Suffolk)	2
Oxford	(Oxfordshire)	2
B Petersfield	(Hants)	2
Plymouth	(Devon)	2
A Plympton	(Do.)	2
Pontefract	(Yorkshire)	2
Portsmouth	(Hants)	2
Preston	(Lancashire)	2
Reading	(Berkshire)	2
B Reigate	(Surrey)	2
Ripon	(Yorkshire)	2
Rochester	(Kent)	2
St. Alban's	(Hertfordshire)	2
Scarborough	(Yorkshire)	2
A Seaford	(Sussex)	2
B Shaftesbury	(Dorset)	2
Shoreham	(Sussex)	2
Shrewsbury	(Shropshire)	2
Southampton	(co. of itself, locally in Hants)	2
Southwark	(Surrey)	2
Stafford	(Staffordshire)	2
Stamford	(Lincolnshire)	2
A Steyning	(Sussex)	2
Taunton	(Somerset)	2
Tavistock	(Devon)	2
B Thirsk	(Yorkshire)	2
Totnes	(Devon)	2
A Tregony	(Cornwall)	2
Truro	(Cornwall)	2
B Wallingford	(Berks)	2
B Wareham	(Dorset)	2
Warwick	(Warwickshire)	2
Wells	(Somerset)	2
A Wendover	(Bucks)	2
A Weobly	(Herefordshire)	2
Wigan	(Lancashire)	2
B Wilton	(Wilts)	2
Winchester	(Hants)	2
Windsor	(Berks)	2
B Woodstock	(Oxfordshire)	2
Worcester	(co. of itself, locally in Worcestershire)	2
Wycombe, Chipping	(Bucks)	2
A Yarmouth	(Hants)	2
Yarmouth	(Norfolk)	2
York	(co. of itself, locally in Yorkshire)	2
[Edward II.]		
A East Grinstead	(Sussex)	2
Retford	(Notts)	2
[Edward III.]		
Dover	(Kent)	2
Harwich	(Essex)	2
Hastings	(Sussex)	2
B Hythe	(Kent)	2
Kingston upon-Hull	(co. of itself, locally in Yorkshire)	2
Maldon	(Essex)	2
B Midhurst	(Sussex)	2
Newcastle-under Lyne	(Staffordshire)	2
Poole	(co. of itself, locally in Dorsetshire)	2
Richmond	(Yorkshire)	2
A Romney	(Kent)	2
B Rye	(Sussex)	2
Sandwich	(Kent)	2
Weymouth and Melcombe-Regis	(Dorset)	4
A Winchelsea	(Sussex)	2
[Henry VI.]		
A Gatton	(Surrey)	2
A Heytesbury	(Wilts)	2
A Hindon	(Do.)	2
B Westbury	(Do.)	2
A Wootton Basset	(Do.)	2
[Edward IV.]		
Grantham	(Lincolnshire)	2
Ludlow	(Shropshire)	2
Wenlock	(Do.)	2
[Henry VIII.]		
Beaumaris	(Anglesey)	1
Berwick-upon-Tweed	(co. of itself)	2
Brecon	(Brecknockshire)	1
Buckingham	(Bucks)	2
Cardiff, sharing with Aberavon, Cowbridge, Ken-fig, Llantrissent, Loughor, Neath, and Swansea	(Glamorganshire)	1
Cardigan, sharing with Aberystwith, Adpar, and Lampeter	(Cardiganshire)	1
Carmarthen	(co. of itself, locally in Carmarthenshire)	1
Carnarvon, sharing with Conway, Criccieth, Nevin, and Pwllheli	(Carnarvonshire)	1
Chester	(co. of itself, locally in Cheshire)	2
Denbigh, sharing with Holt and Ruthin	(Denbighshire)	1
Flint, sharing with Caergwrley, Caerwys, Overton, and Rhyddlan	(Flintshire)	1
Haverfordwest	(co. of itself, locally in Pembrokeshire)	1
Monmouth, sharing with Newport and Usk	(Monmouthsh.)	1
Montgomery	(Montgomerysh.)	1
Pembroke, sharing with Tenby and Wiston	(Pembrokesh.)	1
Radnor, sharing with Kevinleece, Knighton, Knucklas, and Rhayder	(Radnorshire)	1
[Edward VI.]		
A Bossiney	(Cornwall)	2
Boston	(Lincolnshire)	2
A Brackley	(Northamptonshire)	2
A Camelford	(Cornwall)	2
Maidstone	(Kent)	2
A Newport	(Cornwall)	2
Penryn	(Cornwall)	2
Peterborough	(Northamptonshire)	2
A St. Michael's	(Cornwall)	2
A Saltash	(Do.)	2
Thetford	(Norfolk)	2
A West Looe	(Cornwall)	2
Westminster	(Middlesex)	2
[Mary.]		
Abingdon	(Berks)	1
A Aldborough	(Yorkshire)	2
Aylesbury	(Bucks)	2
Banbury	(Oxfordshire)	1
A Boroughbridge	(Yorkshire)	2
A Castle Rising	(Norfolk)	2
A Higham Ferrers	(Northamptonshire)	1
Knaresborough	(Yorkshire)	2
B Morpeth	(Northumberland)	2
B St. Ives	(Cornwall)	2
[Elizabeth.]		
A Aldeburgh	(Suffolk)	2
A Beeralston	(Devon)	2
A Bishop's Castle	(Shropshire)	2
A Callington	(Cornwall)	2
B Christchurch	(Hants)	2
Cirencester	(Gloucestershire)	2
B Clitheroe	(Lancashire)	2
A Corfe Castle	(Dorset)	2
A East Looe	(Cornwall)	2
B Eye	(Suffolk)	2
A Fowey	(Cornwall)	2
A Haslemere	(Surrey)	2
Lymington	(Hants)	2
A Minehead	(Somerset)	2
A Newtown	(Hants)	2
A Newton	(Lancashire)	2
A Queenborough	(Kent)	2
A St. Germain's	(Cornwall)	2
A St. Mawe's	(Cornwall)	2
A Stockbridge	(Hants)	2
Sudbury	(Suffolk)	2
Tamworth	(Warwickshire)	2
A Whitchurch	(Hants)	2
[James I.]		
Bewdley	(Worcestershire)	1
Tewkesbury	(Gloucestershire)	2
Tiverton	(Devon)	2
[Charles II.]		
Durham	(Durham)	2
Newark	(Notts)	2

Scotland.

In the British Parliament, since the Union under Anne.

Edinburgh city . . 1 member.

Districts of Burghs.

Districts.	Burghs.	Counties wherein locally situated.	Members.
1	Dingwall	Ross	1
	Dornock	Sutherland	
	Kirkwall	Orkney	
	Tain	Ross	
	Wick	Caithness	
2	Forres	Elgin	1
	Fortrose	Ross	
	Inverness	Inverness	
	Nairn	Nairn	
3	Banff	Banff	1
	Cullen	Banff	
	Elgin	Elgin	
	Inverury	Aberdeen	
	Kintore	Aberdeen	
4	Aberdeen	Aberdeen	1
	Aberbrothwick	Forfar	
	Brechin	Forfar	
	Inverbervie	Kincardine	
	Montrose	Forfar	
5	Cupar	Forfar & Perth	1
	Dundee	Forfar	
	Forfar	Forfar	
	Perth	Perth	
	St. Andrew's	Fife	
6	Anstruther Easter	Fife	1
	Anstruther Wester	Fife	
	Crail	Fife	
	Kilrenny	Fife	
	Pittenweem	Fife	
7	Burntisland	Fife	1
	Dysart	Fife	
	Kinghorn	Fife	
	Kirkaldy	Fife	
8	Culross	Perth	1
	Dunfermline	Fife	
	Inverkeithing	Fife	
	Queensferry	Linlithgow	
	Stirling	Stirling	
9	Dumbarton	Dumbarton	1
	Glasgow	Lanark	
	Renfrew	Renfrew	
	Rutherglen	Lanark	
10	Dunbar	Haddington	1
	Haddington	Haddington	
	Jedburgh	Roxburgh	
	Lauder	Berwick	
	North Berwick	Haddington	
11	Lanark	Lanark	1
	Linlithgow	Linlithgow	
	Peebles	Peebles	
	Selkirk	Selkirk	
12	Ayr	Ayr	1
	Campbeltown	Argyle	
	Inverary	Argyle	
	Irvine	Ayr	
	Rothsay	Bute	
13	Annan	Dumfries	1
	Dumfries	Dumfries	
	Kirkcudbright	Kirkcudbright	
	Lochmaben	Dumfries	
	Sanquhar	Dumfries	
14	New Galloway	Kirkcudbright	1
	Stranraer	Wigton	
	Whithorn	Wigton	
	Wigton	Wigton	

Ireland.

In the Imperial Parliament, from the Union under George III.

Cities and Boroughs.	Counties wherein locally situate.	Members.
Armagh	(Armagh)	1
Athlone	(Roscommon and Westmeath)	1
Bandon	(Cork)	1
Belfast	(Antrim)	1
Carlow	(Carlow)	1
Carrickfergus	(co. corporate)	1
Cashel	(Tipperary)	1
Clonmel	(Tipperary)	1
Coleraine	(Londonderry)	1
Cork	(co. corporate)	2
Downpatrick	(Down)	1
Drogheda	(co. corporate)	1
Dublin	(co. corporate)	2
Dundalk	(Louth)	1
Dungannon	(Tyrone)	1
Dungarvan	(Waterford)	1
Ennis	(Clare)	1
Enniskillen	(Fermanagh)	1
Galway	(co. corporate)	1
Kilkenny	(co. corporate)	1
Kinsale	(Cork)	1
Limerick	(co. corporate)	1
Lisburn	(Antrim)	1
Londonderry	(Londonderry)	1
Mallow	(Cork)	1
New Ross	(Wexford)	1
Newry	(Down)	1
Portarlington	(King's County and Queen's County)	1
Sligo	(Sligo)	1
Tralee	(Kerry)	1
Waterford	(co. corporate)	1
Wexford	(Wexford)	1
Youghal	(Cork)	1

Universities.

[From the reign of James I.]

Places.	Members.	Places.	Members.
Cambridge	2	Oxford	2

[From the Irish Union under George III.]

Dublin 1

With the aid of the foregoing table we now lay before the reader a view of the present state of the representative

system, carefully indicating the alterations made by the acts of 1832 in those branches of it to which they apply.

1. *As regards the number and local limits of constituencies, and the number of representatives.*

COUNTIES.

England and Wales.—The number of county constituencies before the Reform Act was 52, returning collectively 94 members: viz. two for each county of England, except Yorkshire; four for the latter county; and one for each county of Wales. The several cities and boroughs which are counties-corporate were excluded from the limits of the several shires within which they were locally situated: viz., from Carmarthenshire, the town of Carmarthen; from Kent, the city of Canterbury; from Cheshire, that of Chester; from Warwickshire, that of Coventry; from Gloucestershire, that of Gloucester; from Yorkshire, the town of Kingston-upon-Hull, and the city of York; from Lincolnshire, the city of Lincoln; from Middlesex, London; from Northumberland, the town of Newcastle-upon-Tyne; from Dorsetshire, Poole; from Worcestershire, the city of Worcester; and from Hampshire, the town of Southampton.

The act has increased the number of constituencies to 82, by dividing into two electoral districts each of the 25 counties in schedule (F) of the act, and marked F in the foregoing table: constituting each of the three ridings of Yorkshire a distinct district for the same purpose; and in like manner severing the Lindsey division of Lincolnshire from the other portion of that county, and the Isle of Wight from Hampshire. The number of county members is raised from 94 to 159, as follows:—Two are assigned to each division of each of the counties in schedule (F) and of Lincolnshire; two to each riding of Yorkshire: one member is added to each of the seven undivided counties included in schedule (F 2) of the act, and marked F 2 in the above table; one to each of the three Welsh counties of Carmarthen, Denbigh, and Glamorgan; and one is assigned to the Isle of Wight, separately from Hampshire.

Scotland.—The number (30) of county constituencies and of county members, as existing before the Reform Act, remains unaltered. But for two of the 27 counties mentioned in the foregoing table, as returning one member each, viz., Elgin and Ross, are substituted Bute and Caithness, which before sent only in alternate parliaments; and the remaining six counties, instead of electing alternately as before, now return jointly as follows:—Elgin and Nairn, one member; Ross and Cromarty, one; Clackmannan and Kinross, one. To the last-mentioned electoral district are also annexed three whole parishes, and part of two others, detached by the act from the shire of Perth, and one entire parish from that of Stirling. And, to obviate the inconvenience arising from the great irregularities in the boundaries of some of the Scottish counties, it is enacted that all detached portions of counties shall, for election purposes, be held to be in the several shires within which they are locally included.

Ireland.—The Irish Reform Act of 1832 has made no change in the county representation as to local limits or number of representatives; two members being still returned for each of the 32 counties enumerated in the preceding table.

CITIES AND BOROUGHS.

England and Wales.—The whole number of the cities and boroughs, or districts of boroughs, previously to the act, was 208, returning collectively 415 members. For total extinction as parliamentary boroughs, those were selected the population of each of which, according to the parliamentary returns of 1831, was below 2000. Within this description came the 56 English boroughs in the above list to which the letter A is prefixed, returning collectively 111 members. For reduction from the sending of two representatives to that of one only, those were selected the population of which, according to the same census, was under 4000. These were the 30 English boroughs in the above list to which the letter B is prefixed, from whose proportion of the representation 30 members were deducted; to these must be added two members deducted from the four formerly sent by the united boroughs of Weymouth and Melcombe Regis; making altogether a total of 143 borough members struck out of the old frame of the representation.

Of the distribution of this number among the new constituencies of the United Kingdom (as the total number of members remains unaltered), we have here to speak only of the portion assigned to the populous parliamentary boroughs now created in England and Wales. To these was transferred the election of 63 members out of the 143 thus taken from the old constituencies. Of the 43 new boroughs, 22, containing each a population of 25,000 and upwards, and including the great metropolitan districts, were empowered to return two members each; and the remaining 21, containing each 12,000 inhabitants or upwards, to send one member.

New Boroughs created by the Reform Act, passed June 7, 1832.

City or Borough.	County wherein situated.	Members.	City or Borough.	County wherein situated.	Members.
Ashton-under-Lyne	(Lancash.) .	1	Merthyr-Tydvil	(Glamorgansh.)	1
Birmingham	(Warwickshire) .	2	Oldham	(Lancashire) .	2
Blackburn	(Lancashire) .	2	Rochdale	(Do.) .	1
Bolton	(Do.) .	2	Salford	(Do.) .	1
Bradford	(Yorkshire) .	2	Sheffield	(Yorkshire) .	2
Brighthelmstone	(Sussex) .	2	South Shields	(Durham) .	1
Bury	(Lancashire) . .	1	Stockport	(Cheshire) .	2
Chatham	(Kent)	1	Stoke-upon-Trent	(Staffordshire)	2
Cheltenham	(Gloucestershire)	1	Stroud	(Gloucestershire) .	2
Devonport	(Devon) .	2	Sunderland	(Durham) .	2
Dudley	(Worcestershire) .	1	Swansea, sharing with Aberavon, Kenfig, Loughor, and Neath: formerly contributory to Cardiff, now detached	(Glamorganshire)	1
Finsbury	(Middlesex) .	2	Tower Hamlets	(Middlesex) .	2
Frome	(Somerset) .	1	Tynemouth	(Northumberland) .	1
Gateshead	(Durham) .	1	Wakefield	(Yorkshire) .	1
Greenwich	(Kent) .	2	Walsall	(Staffordshire) .	1
Halifax	(Yorkshire) .	2	Warrington	(Lancashire) .	1
Huddersfield	(Do.) .	1	Whitehaven	(Cumberland) .	1
Kendal	(Westmorland) .	1	Whitby	(Yorkshire) .	1
Kidderminster	(Worcestersh.) .	1	Wolverhampton	(Staffordshire)	2
Lambeth	(Surrey) .	2			
Leeds	(Yorkshire) .	2			
Macclesfield	(Cheshire) .	2			
Manchester	(Lancashire) .	2			
Marylebone	(Middlesex) .	2			

Contributory Boroughs added by the Reform Act in Wales.

Borough	Contributory	County	Borough	Contributory	County
To Beaumaris—	Amlwch, Holyhead, Llangefni	Anglesey	To Haverfordwest—	Fishguard, Narberth	Pembrokeshire
To Carmarthen—	Llanelly .	Carmarthenshire	To Montgomery—	Llanfyllin, Llanidloes, Machynlleth, Newtown, Welsh Pool	Montgomeryshire
To Carnarvon—	Bangor .	Carnarvonshire	To Pembroke—	Milford .	Pembrokeshire
To Denbigh—	Wrexham .	Denbighshire	To Radnor—	Presteigne .	Radnorshire
To Flint—	Holywell, Mold, St. Asaph	Flintshire			

In the important matter of *boundaries*, two great objects were to be attained; the fixing of appropriate limits to the boroughs of large population newly created, and the extending the limits of the old boroughs in the many instances in which a considerable population had, in the lapse of ages, accumulated without the ancient boundary. A large agricultural district was also annexed, for the purposes of parliamentary election, to each of the four boroughs of Aylesbury, Cricklade, East Retford, and New Shoreham. And as regards the Welsh districts of boroughs, it may be observed that the principle laid down in the act of Henry VIII., that *all* the boroughs in each county should share the representation—a principle which the arbitrary interference of the Crown, and the decisions of election committees, had since rendered in many instances inoperative—was now restored in its full vigour.

Scotland.—The number of town representatives is raised from 15 to 23; two instead of one being assigned to the city of Edinburgh; two to that of Glasgow, detached from the district of burghs numbered 9 in the foregoing table; one to that of Aberdeen, detached from district No. 4; one each to the towns of Dundee and Perth, detached from district No. 5; and one each to the large modern towns of Greenock and Paisley. As regards the districts of burghs, their number, their general locality, and their proportion of members (one to each district), remain nearly as before; but as regards the particular places joined in the respective districts, the following alterations are made by the Reform Act:—To district No. 1 is added the town of Cromarty in the shire of that name, not before included in any district. To No. 3, in like manner, is added the town of Peterhead, in the shire of Aberdeen, before unrepresented. To No. 4, from which Aberdeen is detached, Forfar is transferred from No. 5; and the towns of Dundee and Perth being also detached from No. 5, the two remaining towns of that district, Cupar and St. Andrews, are now joined with the five previously forming district No. 6. The city of Glasgow being detached from district No. 9, the towns of Kilmarnock and

Port-Glasgow, before unrepresented, are added to it. In district No. 11, Peebles and Selkirk being disfranchised by the act, and merged in the counties in which they are respectively situated, the three formerly unrepresented towns of Airdrie, Falkirk, and Hamilton, are joined in their stead with the antient burghs of Lanark and Linlithgow. In No. 12, in like manner, the burgh of Rothsay is merged in the shire of Bute, and the town of Oban is substituted in its place. The great increase in the population of the maritime vicinity of Edinburgh has occasioned the creating of one district entirely new, comprising the three towns of Leith, Portobello, and Musselburgh, without, however, increasing the previous number of districts, the towns of No. 5, in the old arrangement, being all distributed in the new as above described. New and suitable parliamentary limits are assigned in the schedules of the act, as well to the several antient boroughs as to those newly created.

Ireland.—In the list of cities and boroughs sending representatives, no alteration is made by the Irish Reform Act; but two members each, instead of one, are assigned to Belfast, Galway, Limerick, and Waterford, thus raising the whole town representation from 35 members to 39. The limits of the parliamentary boroughs are defined, and to the greater number of them new limits are assigned, by the Boundary Act annexed.

UNIVERSITIES.

One member is added by the Irish Reform Act to the one previously returned by the university of Dublin.

2. *Elective Franchise.*

COUNTIES.

England and Wales.—Until the Reform Act, the parliamentary franchise in counties had remained without extension or alteration, as limited full three centuries before by the statutes of the 8th and 10th of Henry VI., the former of which confined the right to such 'as had freehold land or tenement to the value of 40*s*. by the year at least above all charges;' the latter to 'people *dwelling and resident* within the county, &c., whereof every man shall have freehold to the value of 40*s*. by the year. In order to render a man a freeholder, and complete his qualification for voting, it was necessary, not only that he should have a freehold interest in his lands and tenements, but that he should hold them by freehold tenure: consequently copyholders, holding by what is technically termed *base* tenure, as well as *termors*, having only a chattel interest in their estates, were excluded from voting. Doubts having been raised as to the right of copyholders, it was expressly enacted by the 31 Geo. II., c. 14, that no person holding by copy of court-roll should be thereby entitled to vote. The Reform Act extends the franchise by admitting not only copyholders, but leaseholders, and even occupiers, under certain limitations; and abridges it in some cases of freeholds not of inheritance, as also in all cases of land situate in a city or borough, and which being occupied by the proprietor would give him a parliamentary vote for that city or borough. In establishing the right to the county franchise, questions of tenure and interest have become of comparatively little importance, except as they are connected with value; for now what is commonly, though improperly, called a tenant at will (that is, from year to year) occupying land of the annual rent of 50*l*. has a right to vote for a county, without reference to the tenure by which the lessor holds the land, or the interest that he may have in it. By 18 Geo. II., c. 18, s. 5, it was enacted that no person should vote for a county unless he had been for *twelve* calendar months in actual possession of the rents and profits to his own use, except in particular cases. But by the statute of 1832, by s. 26 it is enacted, that no person shall be registered as a freeholder or copyholder, unless he was in actual possession of the rents and profits for *six* months previous to the last day of July of the year wherein he claims to be registered. Leaseholders and their assignees, and yearly tenants, must have occupied for *twelve* months before the same period, except in the cases excepted by the above-mentioned statute of George II. Value, therefore, has now become the criterion upon which, in many cases, the right of voting wholly depends; and in all cases it is a most material subject of inquiry, in order to determine in what character, whether as freeholder, copyholder, leaseholder, or occupier, an elector should make his claim to be registered.

1. If lands or tenements are held at a yearly rent of 50*l*., bare occupation, as tenant from year to year, is sufficient to qualify; no further interest in the lands, &c., being necessary, and it being immaterial by what tenure they are held. 2. So also is the occupation of lands, &c., of 50*l*. yearly value, as sub-lessee or assignee of any under-lease created originally for a term of not less than 20 years, how small a portion soever of the original term may remain unexpired. 3. The original lessee of a term created originally for 20 years, of lands of 50*l*. yearly value, or the assignee of such term, is entitled to vote in like manner, whether or not he is the occupier of such lands. 4. The occupier of lands of 10*l*. yearly value, as sub-lessee or assignee of any underlease of a term of not less than 60 years. 5. So likewise the original lessee or the assignee of such a term of the lands of 10*l*. yearly value, is entitled, whether occupying or not; nor is the nature of the tenure material in any of the above cases; but twelve months' possession previous to the last day of July is required in all. 6. The being seised of an estate—whether of inheritance or for a life or lives—whether freehold, copyhold, or of any other tenure, to the like yearly value of 10*l*., entitles.

Freehold lands or tenements of 40*s*. yearly value are still sufficient to give a vote in the four following cases:—

1. If it be an estate of inheritance. 2. If not an estate of inheritance, but only an estate for life or lives, if the elector was seised previously to the 7th of June, 1832 (the day on which the act received the royal assent), and continues so seised at the time of registration and of voting. 3. If acquired subsequently to that day, if the elector be in actual and *bonâ fide* occupation at the time of registration and of voting. 4. Or if acquired subsequently to that day, if it came to the elector by marriage, marriage settlement, devise, or promotion to any benefice or any office.

Of freehold or copyhold estates six months' possession, and of leasehold estates twelve months', is required, previously to the last day of July, in the year of registration, except they come by descent, succession, marriage, marriage settlement, devise, or promotion, &c.

Now, also, it has become material to consider how the lands or tenements are locally situated: for if they are freehold within a city or borough, and in the freeholder's own occupation, so as to confer a right to vote for such city or borough,—or if copyhold or leasehold, and occupied by him or any one else so as to give the right of voting for such city or borough to him or any other person,—they cease to qualify for a county vote.

However, by the 16th section of the act, an express reservation is made of all *existing* rights of suffrage possessed by county freeholders, provided they are duly registered according to the provisions of the act itself.

Scotland.—Under George II. enactments were made which rendered the proving of the old forty-shilling votes yet more difficult, so that many more of them disappeared, and at the close of the last century very few remained. Although the Scottish act of 1681 enacted that the right of voting should be in persons publicly infeoffed in property *or* superiority of lands of 40*s*. old extent, or of 400*l*. Scots valued rent, thus making a distinction, it should seem, between property and superiority, yet it was constantly interpreted to mean that superiors, that is, tenants-in-chief, or persons holding immediately of the crown, were *alone* entitled to vote. Thus proprietors of estates, of whatever value, holding from a subject, were excluded from the franchise. It is computed that in several counties nearly one-half the lands were held in this manner, and in the whole kingdom one-fifth of the lands were so held. The class of landholders thus excluded comprised not only the middling and smaller gentry, and the industrious yeomen and farmers who had inherited or acquired some portion of landed property, but also some men of estates worth from 500*l*. to 2000*l*. per annum; while many persons, who had not the smallest actual interest in the land, possessed and exercised the elective franchise. When a person of great landed property wished to multiply the votes at his command, his course was, to surrender his charter to the crown, to appoint a number of his confidential friends, to whom the crown parcelled out his estates in lots of 400*l*. Scots valued rent, and then to take charters from those friends for the real property, thus leaving them apparently the immediate tenants of the crown, and consequently all entitled to vote. This operation being open as well to peers as to great commoners, they availed

themselves of it accordingly, thus depreciating or extinguishing the franchises of the smaller proprietors. This legal fraud began in the last century, and was chiefly practised subsequently to the accession of George III. Among the various modes by which it was performed, the most common were by life-rent charters, by charters on *wadset* or mortgage, and by charters in fee. The parliamentary representation of the Scottish counties therefore had, according to the expression of a learned lord, 'completely slid from its basis.' The total number of county voters, as compared with the number of persons directly interested in the property of the soil, was extremely small, and of these the number of real votes scarcely exceeded that of the fictitious ones.

The new basis of county suffrage appears, by the Reform Act for Scotland, to be assimilated, as closely as the difference between the modes of possessing and occupying lands, &c., in the two countries will permit, to the system established for England and Wales. While the old class of rights to the suffrage are preserved to the individuals in actual possession of them before March 1st, 1831, provision is made against their perpetuation; while the body of electors newly admitted consists of owners to the value of 10*l.* a year,—of leaseholders for 57 years or for life, whose clear yearly interest is not less than 10*l.*—of leaseholders for 19 years where such yearly interest is worth not less than 50*l.*,—of yearly tenants whose rent is not less than 50*l.* per annum,—and of all tenants whatsoever who have paid for their interest in their holding an amount not less than 300*l.* The same difference is made as in the English act, between the freeholder and the mere occupier, as to the *six* months' proprietorship required in the former case and the *twelve* months' occupancy in the latter; and the like exceptions from this condition as to the length of possession in favour of cases wherein either ownership or lease comes to a person by inheritance, marriage, marriage settlement, "*mortis causâ* disposition," or appointment to any place or office.

Ireland.—The act of union made no alteration in the parliamentary suffrage of the Irish counties. The qualification of a freeholder remained the same as before, a clear annual forty-shilling interest for a life: and as it was customary in Ireland to grant leases on lives, freeholders were thus created whose votes, from their extreme poverty, and consequent inability to discharge their legal obligations to their landlord, were disposable by him as a matter of course. This practice of multiplying freeholds for election purposes merely was carried to an excessive and most mischievous extent, reducing the franchise almost to universal suffrage, among individuals who, by the very instrument by which they were professedly made free, were reduced to the most abject state of political bondage. Thus many of the counties, in choosing their representatives, lay under the absolute dictation of some great territorial proprietor; and there were few in which a coalition of two or three of the principal landowners would not determine the election according to their own wishes. Under these circumstances, the provision of the Catholic Emancipation Act of 1829, which raised the freehold qualification in the counties of Ireland from 40*s.* to 10*l.*, can hardly be regarded as a virtual disfranchisement.

The whole civil organization of Ireland having been introduced directly from England, and the system of tenures in particular being the same in both countries, the provisions of the Irish Reform Act which have reference to the territorial franchise are more strictly analogous to those of the act for England than those of the Scottish act could well be made, at least in appearance. The existing freehold rights being preserved here, as in the other two divisions of the empire, to their individual possessors, and the 10*l.* freehold franchise being already established by the above-mentioned provision of the act of 1829, the classes of electors newly created are—1, the 10*l.* copyholders; 2, lessees or assignees having a clear yearly interest of 10*l.* in a leasehold created originally for 60 years or upwards, or of 20*l.* in a leasehold of not less than 14 years, whether in their actual occupancy or not; 3, sub-lessees or assignees of any underlease in either of the two cases just mentioned, actually occupying; 4, the immediate lessees or assignees, and they only, having a 10*l.* yearly interest in a 20*l.* lease, and actually occupying. The like provision is made as in the English act, against any title to the county franchise being derived from any holding whatever that would entitle to vote for a city or borough.

CITIES AND BOROUGHS

England and Wales.—The want of any uniform basis of suffrage in the parliamentary boroughs, the endless diversity of the claims to its exercise derived from the various political as well as local influences that had operated upon them in the course of ages,—a diversity which the numerous, various, and often conflicting decisions of election committees of the House of Commons had additionally complicated and confused—was one of the most grievous defects of the old representative system. The generally prevailing custom, too, that the non-residence of borough voters entailed no disqualification, was one of the most serious evils comprised under this head. The new act has prepared the way for sweeping off all the claims to the franchise founded on the old and long-abused titles to borough freedom, by establishing a uniform qualification, resting chiefly on the basis of inhabitancy.

It provides, that in every city or borough which shall return members, every male person of full age and not subject to any legal incapacity, who shall occupy, within such city or borough, or within any place sharing in elections with it, as owner or tenant, any house, warehouse, counting-house, shop, or other building, either separately or jointly with any land, of the clear yearly value of not less than 10*l.*, shall, if duly registered, as directed in another part of the act, be entitled to vote in the election of members for such city or borough; provided always, that no such person shall be so registered in any year, unless he shall have occupied such premises for twelve calendar months previous to the last day of July in that year; nor unless such person, where there shall be a rate for the relief of the poor, shall have been rated to all rates for the relief of the poor made during such his occupation; nor unless such person shall have paid, on or before the 20th of July in the same year, all the poors' rates and assessed taxes due from him previously to the 6th of April preceding; provided also, that no such person shall be so registered unless he shall have resided for six calendar months previous to the last day of July within the city or borough, or within the place sharing in the election, or within seven miles thereof. The premises in respect of the occupation of which any person shall be entitled to be registered as a voter, need not be always *the same* premises, but may be different premises occupied in *immediate* succession by such person during the twelve calendar months previous to the last day of July: such person having paid, on or before the 20th of July, all the poors' rates and assessed taxes due before the 6th of April preceding, in respect of *all* such premises so occupied by him in succession.—Furthermore, when any premises in any such city or borough, or place sharing in the election, shall be *jointly* occupied by more persons than one, each of such joint occupiers shall be entitled to vote, in case the clear yearly value of such premises shall be of an amount which, when divided by the number of such occupiers, shall give a sum of not less than 10*l.* for each occupier. And in every city, borough, or place sharing in election, it shall be lawful for any person occupying as above specified in any parish or township in which there shall be a rate for the relief of the poor, to claim to be rated; and upon such occupier so claiming, and actually paying or tendering the full amount of the rates, the overseers are to put the name of such occupier upon the rates; and in case such overseers shall neglect or refuse so to do, such occupier shall nevertheless be deemed to have been rated.

The formerly anomalous position of cities and towns which are counties of themselves, as regards the possession of the elective franchise, is rectified by the act. Such counties of cities and towns are now included, for the purposes of county elections, in the several counties at large, or divisions of counties, in which they are locally situated—with this restriction only as regards freeholds *for life*;—that no person shall be entitled to vote in the election of knights of the shire, or of members for any city or town a county of itself, in respect of any freehold whereof such person may be seised for his own life, or for the life of another, or for any lives, except such person shall be in the actual occupation, or except the same shall have come by marriage, marriage settlement, devise, or promotion to any benefice or to any office, or except the same shall be of the clear yearly value of not less than 10*l.* It is further provided that in every city or town being a county of itself, in the election for which freeholders or burgage tenants, either

with or without any superadded qualification, now have a right to vote, every such freeholder or burgage tenant shall be entitled to vote, if duly registered; but no such person shall be so registered in respect of any freehold or burgage tenement, unless he shall have been in actual possession thereof, or in receipt of the rents and profits for his own use, for twelve calendar months previous to the last day of July (except where the same shall have come to him, within such twelve months, by descent, succession, marriage, marriage settlement, devise, or promotion to any benefice or office), nor unless he shall have resided for six calendar months previous to the last day of July within such city or town, or within seven miles of it;—the limits of such city or town a county of itself, being, for the purposes of this enactment, those settled by the general parliamentary Boundary Act for England and Wales. Similar provision as to length of occupancy, &c., is made in the case of persons having a previous freehold qualification to vote for any of the boroughs of Aylesbury, Cricklade, East Retford, or New Shoreham.

Such are the provisions which constitute what is popularly called, by reference to their most prominent feature, 'the ten-pound householder qualification.'

But as in the settling of the places which were thenceforward to elect, and in apportioning the members, the new act made a large compromise with the old system, so also it made no inconsiderable one, for a season at least, in sparing to a certain extent the rights to the parliamentary franchise grounded on the old titles to borough freedom. In all such cases, however, it imposes the very important condition of *residence*. It provides that every person who would have been entitled to vote in the election of members for any city or borough as a burgess or freeman, or in the city of London as a freeman and liveryman, shall be entitled to vote if duly registered; and that every other person having, previous to the act, a right to vote in the election for any city or borough by virtue of any other qualification than those already mentioned, shall retain such right so long as he shall be qualified as an elector according to the usages and customs of such city or borough, or any law in force at the passing of the act, and shall be entitled to vote if duly registered; but in both of the above cases it is enacted that no such person shall be so registered unless he shall, on the last day of July, be qualified in such manner as would entitle him then to vote if such day were the day of election; nor unless for six calendar months previous to that day he shall have resided within such city or borough, or within seven miles from the place where the poll shall heretofore have been taken, or, in the case of a contributory borough, within seven miles of such borough. As regards the second class of voters last mentioned, it is further enacted that every such person shall for ever cease to enjoy such right of voting if his name shall have been omitted for two successive years from the register of parliamentary voters for such city or borough, unless he shall have been so omitted in consequence of his having received parochial relief within twelve calendar months previous to the last day of July in any year, or of his absence on naval or military service.

The expedient to which, to serve party purposes during the agitation of the Reform measure, many of the governing bodies of corporations had resorted, of admitting unusually large numbers of freemen, occasioned the following limitations of the above reservation of the elective franchise of freemen to be introduced into the act, viz.:—That no person who shall have been elected, made, or admitted a burgess or freeman since March 1st, 1831, otherwise than in respect of birth or servitude, or who shall hereafter be so, shall be entitled to vote; that no person shall be entitled as a burgess or freeman in respect of birth, unless his right be originally derived from or through some person who was a burgess or freeman, or was entitled to be admitted as such, before the said 1st of March, 1831, or from some person who since that time shall have become, or shall hereafter become, a burgess or freeman in respect of servitude; and that no person shall be entitled to vote for any city or borough (except it be a county of itself) in respect of any estate or interest in any burgage tenement or freehold which shall have been acquired by such person since the same 1st of March, 1831, unless it shall have come to such person previously to the passing of this act, by descent, succession, marriage, marriage-settlement, devise, or promotion to any benefice or office.

It is also provided in general that no person shall be entitled to be registered in any year as a voter for any city or borough who shall, within twelve calendar months previous to the last day of July in that year, have received parochial relief or other alms which, according to the previously existing law of parliament, disqualified from voting.

SCOTLAND.—Owing to the previous absence of all pretence or shadow of popular suffrage in the Scottish boroughs, the revolution made in their parliamentary constituencies by the Reform Act of 1832 is effected simply, completely, and at once. The franchise is taken from the members of the town councils and their delegates, in whom as such it was before exclusively vested, and a 10*l.* qualification, by ownership or occupancy, substituted in its place, with the like conditions, as in the English act, of twelve months' previous occupancy, payment of assessed taxes, registration, and non-receipt of parochial relief.

IRELAND.—In the Irish cities and boroughs the change immediately worked by the Parliamentary Reform Act is relatively greater than in England, owing chiefly to the fact that the municipal corporations of the former country existed in a state yet more thoroughly anomalous and corrupt than those of the latter. [CORPORATIONS (MUNICIPAL) OF IRELAND.] Here again, the actually existing and the inchoate titles to the parliamentary suffrage being reserved, as in the English act, on condition of residence within seven miles, and honorary freemen created since March 30, 1831, being excluded, the 10*l.* ownership or occupancy qualification is established as the new basis of suffrage, on condition of registration with *six* months' previous occupancy and payment of all rates due for more than one half-year. Reservation is also made, as in the English boroughs, of rights by freehold under 10*l.*, when accruing before the passing of the act, by descent, marriage, &c. The clause of the Catholic Emancipation Act, which raised the freehold qualification in counties at large to 10*l.*, left it at the old amount of 40*s.* in the several counties of cities and towns; but the Reform Act raises it there to the same scale as in the counties at large (only reserving for life the existing 40*s.* rights), and at the same time gives the parliamentary franchise for such corporate counties to the same classes of leaseholders, and on the same conditions, whom it admits in the counties at large.

UNIVERSITIES.

In the two English universities the parliamentary suffrage is independent of residence, property, or occupancy, being vested in the doctors and masters of arts of Cambridge and Oxford respectively, so long as they keep their names on the boards of their respective colleges. In that of Dublin, in like manner, it is possessed by the fellows, scholars, and graduates of Trinity College, on the like condition.

The establishment of a general and uniform system of registration of voters, calculated to obviate much of the inconvenience of contested returns, is another very important feature of the Reform Acts; for the various and rather complicated details of which we must refer the reader to the acts themselves.

Having thus given a view of the qualifications for exercising the parliamentary franchise as now established throughout the British Islands, it remains to notice the principal of those legal disqualifications which are of a personal nature, and operate independently of all proprietorship or occupancy.

Every woman, of whatever age, and however independently situated as to property and social relations, is as much excluded from voting as from being elected. As to age in male persons, the only exception is that which excludes all minors, that is, all who have not completed their twenty-first year. The exception which regards *aliens* is so natural and obvious that the bare mention of it may here suffice, as this is not the place in which to examine the various difficulties that in many cases have arisen and still arise in strictly defining who are aliens and who are not. By the antient 'law of parliament,' which forms an integral portion of the common law, lunatics are very reasonably incapacitated, as also are paupers in city or borough elections. It was resolved by the House of Commons in 1699 (14th December), that 'no peer of parliament has a right to vote for members of that house.' After the Union with

Ireland, this resolution, which was usually repeated at the beginning of every session, was altered into the following form: 'That no peer of this realm, except such peer of that part of the United Kingdom called Ireland as shall for the time being be actually elected, and shall not have declined to serve, for any county, city, or borough of Great Britain, hath any right to give his vote in the election of any member to serve in parliament.' The vast increase, since the commencement of the last century, owing to the establishment of so many new branches of revenue, in the number of persons employed immediately by the crown as revenue-collectors, occasioned the enactment of several statutes of exclusion from the parliamentary franchise. Thus the 22nd George III., c. 41, excludes every class of officers concerned in the collection or management of the excise, customs, stamp duties, salt duties, window and house duties, or in any department of the business of the post-office. By 3 George IV., c. 56, s. 14, it was first enacted that no justice, receiver, surveyor, or constable, appointed by that act at any one of the eight police-offices of the English metropolis, shall be capable of voting for Middlesex, Surrey, Westminster, or Southwark; and by 10 George IV., c. 44, which established the new system of police in certain districts of the metropolis (the operation of which has since been extended to meet the local extension of the police-system), it was enacted that no justice, receiver, or person belonging to the police-force appointed by virtue of that act, shall be capable of voting for Middlesex, Surrey, Hertfordshire, Essex, or Kent, or for any city or borough within the metropolitan district. Persons legally convicted of perjury or subornation of perjury, or of taking or asking any bribe, are thereby for ever incapacitated from voting.

As regards religious grounds of disqualification in general, it should be observed, that as no oaths are now required to be taken, nor declarations to be made, as a preliminary either to registration or to voting, all such disabilities as might have arisen from refusal to take or make them are of course removed.

3. *Qualifications of Candidates.*

Of the close relation so long subsisting between the grounds of the elective franchise and of eligibility, and which had sprung from their original identity, we find distinct traces in the similarity between the heads of disqualification in either case. Women, minors, aliens, and lunatics are of course excluded in the latter case as well as in the former. It would be needless to remark, that peers of *parliament*, that is, actual members of the House of Lords, are ineligible to the House of Commons, except in order to point out this distinction—that any Irish peer, not being among the twenty-eight sitting in the House of Lords for the time being as representatives of the Irish peerage, and being, therefore, though a peer of the realm, not a peer of parliament, is eligible to represent any constituency in the United Kingdom, although such is not the case with Scotch peers who are not representative peers. No person concerned in the management of any duties or taxes created since 1692 (except commissioners of the treasury), nor any officer of the excise, customs, stamps, &c., nor any person holding any office under the crown created since 1705, is eligible. In like manner, pensioners under the crown during pleasure, or for a term of years, are wholly excluded. Any member, however, who accepts an office of profit under the crown existing prior to 1705, though he thereby vacates his seat, is capable of being re-elected. Contractors with government are ineligible; and it is enacted, that if any person so disqualified shall sit in the house, he shall forfeit 500*l.* per day for so doing; and that if any person having a contract of this nature admits a member of the house to share in it, he shall forfeit 500*l.* to the prosecutor. Again, by 3 Geo. IV., c. 55, no police justice of the metropolis can sit in parliament.

The twelve judges for the time being are disqualified, as sitting in the House of Peers, though, as judges, they have merely a *consultative* voice there. The vice-chancellor also is excluded, though the master of the rolls is not. The exclusion of ecclesiastics from seats in the commons' house, seems not only to have been a natural result of the presumed urgency of their pastoral duties, but to have reference to the period when their share of those general contributions to the extraordinary exigencies of the state, the business of granting which, as we have already seen, first gave form and consistency to the parliamentary representation in general, was yielded by them as a distinct body. Sheriffs of counties, and mayors and bailiffs of boroughs, as being themselves returning-officers in parliamentary elections, are ineligible for the several districts respectively for which it is their duty to make returns.

The repeal of the Corporation and Test Acts in 1828, and the passing of the Catholic Emancipation Act in 1829, have worked one very important alteration in the constitution of the commons' house, by removing nearly altogether the widely-operating religious disqualifications which previously existed. The engagement, 'on the true faith of a Christian,' to abstain from all designs hostile to the Church as by law established, which the latter act has substituted for the oath and declaration formerly required, excludes no man professing Christianity in however general terms, and seems indeed to have no effective operation but against individuals of the Jewish race and creed, to whose admission this bar is still opposed.

Such are the chief personal disqualifications, at common law or by statute, from sitting in the commons' house of parliament; presenting, as already remarked, a general analogy to those existing against the voter.

We now come to the other branch of the subject, the qualifications by property and residence; and here, in the case of the English and Irish representation at least, the analogy no longer holds good. The landed qualification for an English, Welsh, or Irish member, remains as before the Reform Acts, viz., for a county member an estate of 600*l.* a year, and for a city or borough member, of 300*l.* To represent a university no property qualification is requisite. The only *personal* exceptions from this condition are in favour of the eldest sons of peers, of *bishops having seats in the House of Lords*, and of persons legally qualified to be county members. The qualifying property may be situated in any part of England, Wales, Ireland, or Berwick-upon-Tweed. As regards the Scottish part of the representation, it is worthy of especial remark, that the property qualifications enacted for England within a very few years after the union with Scotland, have never been extended to the latter portion of the kingdom; and that consequently the conditions of suffrage and of eligibility have remained there, according to the original constitution of the representative system in both countries, one and the same, excepting only the antiently essential condition of *residence*, which has long been done away throughout the United Kingdom without any reservation or limitation whatever; and excepting also that the Scottish Reform Act of 1832 has rendered unnecessary for county members the qualification of an *elector* formerly required.

Issuing of Writs for a General Election; Election Proceedings and Returns.

An essential and very important part of the representative machinery is that which regards the due transmission from the central to the local authority of the summons to elect, the superintendence of the election proceedings, and the due return from the local to the central authority of the names of the individuals chosen. When the Lord Chancellor, the highest officer of state, has received the written command of the king in council for the summoning of a new parliament, he thereupon sends his warrant or order to the highest ministerial officer acting under him, the clerk of the crown in chancery, to prepare and issue the *writs*, or written authorities for that purpose, to the several sheriffs, whether of counties at large or of counties corporate.

In the early periods of our history, when the shire-motes, or county courts, were held regularly once a month, and the borough courts once a week or once a fortnight, there was no need to incur the trouble and inconvenience of a special meeting of the members of those courts, that is, of the freeholders in the former case and the burgesses in the latter, to elect the parliamentary representatives; and accordingly the sheriff was simply required to cause the election of the county members at the next county court, held in the regular course, or at an adjourned meeting of that court, in case such adjournment were necessary in order to allow time for giving due notice of the election. It was not until the importance of the county courts declined, that a different arrangement became necessary; nor was it until the 25th of George III., that it was enacted that the sheriff, on receipt of the writ, should call a special county court for the purpose of the election.

The writ, thus addressed under the great seal to the sheriff of a county at large, requires him not only to cause the election of the county representatives, but also of those of each city and borough within his jurisdiction. And accordingly, on receiving this command, he issues a *precept* under his own seal to the head of each municipality enjoying the elective franchise, which precept is to be returned to him within a limited time, together with the name of the person or persons chosen *; in like manner as he himself is bound to return, before a certain day previous to that on which the parliament is summoned to assemble, to the clerk of the crown, from whom he received it, the writ, with the names of the persons chosen, whether as county or as borough members. Such, in brief, as regards the returning-officers and responsible conductors of elections, has been the system from the commencement of the general representation.

In fourteen of the forty-three new and populous parliamentary boroughs created by the Reform Act for England and Wales, which had already a municipal or other chief civil officer or officers in whom this function could be appropriately vested, it is so entrusted by the Act. As regards the others, it is provided, that the sheriff of the respective counties shall, in the month of March in each year, by writing under his hand, to be delivered to the clerk of the peace for that county within a week from its date, and be by him filed with the records of his office, appoint for each of such boroughs a fit person resident therein to be the returning-officer until the nomination to be made in the March following. In case of such person's death or incapacity from sickness or any other sufficient impediment, the sheriff, on notice thereof, is forthwith to appoint in his stead a fit person, resident as aforesaid, to be the returning-officer for the remainder of the year. No person so nominated as returning-officer shall, after the expiration of his office, be compellable thereafter to serve again in the same office. Neither shall any person in holy orders, nor any churchwarden or overseer of the poor, be so appointed; nor shall any person so nominated be appointed a churchwarden or overseer during the time he shall be such returning-officer. Any person qualified to serve in parliament is exempted from such nomination as a returning-officer, if within one week after receiving notice of such appointment he make oath of his qualification before any justice, and forthwith notify the same to the sheriff. In accordance, however, with all previous usage, it is provided that 'in case his majesty shall be pleased to grant his royal charter of incorporation to any of the said boroughs named in the said schedules (C) and (D), which are not now incorporated, and shall by such charter give power to elect a mayor or other chief municipal officer for any such borough, then and in every such case such mayor or other chief municipal officer for the time being shall be the only returning-officer for such borough; and the provisions hereinbefore contained with regard to the nomination and appointment of a returning-officer for such borough shall thenceforth cease and determine.'

The division of both counties and boroughs into convenient polling-districts,—the shortening of the time of polling in contested elections, from the old period of fifteen days to two days in England, Wales, and Scotland, and to five in Ireland,—the restriction of inquiry at the poll into the elector's right to the ascertaining the identity of name and qualification with those contained in the register of voters (thus abolishing the old tediously litigious practice of election scrutinies),—and the limitation of the necessary expense of election proceedings, borne by the candidates or their proposers,—are among the more important of the recent improvements. For details, as we have already done in the case of the new system of registration, we must refer to the several Reform Acts of 1832.

Having thus given, we believe, a tolerably just though succinct view of the history and present state of the representative system of the British empire, so far as it can be distinctly shown without continual reference to the other branches of the legislature, we refer for an account of the organization and operations of the Commons, 'in parliament assembled' to a subsequent volume of this work. [PARLIAMENT, IMPERIAL.]

There too may be the fit occasion for offering some indications of the future changes in its relative position as a branch of the legislature, to which the revolution recently commenced in its internal constitution must eventually lead. A word as to the progress of this internal revolution itself must conclude the present notice.

We have seen how the popular representation arose, first as a convenient, then as a necessary appendage to the feudal parliament of the Anglo-Normans. We have seen how, as early at least as the parliamentary settlement of the crown upon the house of Lancaster, that popular representation, under the title of the House of Commons, had become an effective, integral, independent, and solemnly recognized branch of the legislature. We have traced, from that period downwards, the twofold operation, of the crown in undermining this equal and sometimes preponderating independence of the Commons' House, and of that House itself in contracting the limits and abridging the rights of the constituent bodies, until the original constitution of the representative body itself was absolutely subverted. And last of all we have seen that which, in the present day, it is most interesting to consider,—the re-action of an enlarged and enlightened public opinion on the legal constitution of the House. In an historical view it is far less important to examine the merits of the late measures of representative amelioration in detail, than to mark the maturity of a new political element which they indicate, and the new line of constitutional progression which they have begun. No matter that the Reform Acts, as they are called, have made but a compromise with the exceeding corruptions and anomalies of the old system, and have left some of its most important usurpations untouched: no matter that the Commons' House, which in the days of its pristine vigour was democratic in the fullest sense of the term, is still, though somewhat popularized by the recent changes, a highly aristocratic body: we do not the less find in these changes a successful effort of the national intelligence and will, not so much to replace the legislative representation on the basis on which it stood at the close of the fourteenth century, and which, from the causes we have previously stated, was fixed without any scientific or symmetrical proportioning even of the number of representatives to that of constituents, but to mould it into some shape more accordant with the present advanced state of general information in the great body of the people; to render it, in short, a popular representation in fact as well as in name. Towards this point, how much soever they have fallen short of it, the late alterations by parliamentary enactment distinctly tend. The spirit that predominates in them plainly shows from what quarter the impulse came to which they owe their being; and it is a reasonable, at least, if not a necessary inference, that nothing short of a retrogression of the public intelligence can prevent the impulse from being repeated until the great object we have stated shall be completely attained.

*COMMONS, IRISH HOUSE OF. [PARLIAMENT OF IRELAND.]

COMMONS, DOCTORS'. [DOCTORS' COMMONS.]

COMMUNION (the Latin *communio*, the Greek *κοινωνία*, *koinônia*) is used to designate the uniformity of belief by which a number of persons are united in one denomination, or church, as the Roman Catholic, Anglican, or Lutheran communion. *Communio* is employed repeatedly in this sense in the canons of the Council of Elvira (Illiberitanum) A.D. 313. For the examination and comparison of scriptural passages, containing the words *κοινωνία* and *κοινωνεῖν*, the Greek Concordances of the New Testament may be consulted.

Communion is used more especially for the common or public act of sharing or participating in the sacrament, eucharist, or Lord's Supper. Of the origin and use of the word communion in this sense an account is given by Casaubon, *Exercitat.* 16, § 30. During the first three centuries the communion was celebrated every Sunday. (Bingham's *Origines Ecclesiasticæ*, vol. v. c. 9.) It was subsequently administered only three times in the year, namely, at Easter, Whitsuntide, and Christmas. By the general council of Lateran, in 1215, it was decreed, in order to check the apparent inclination in many to neglect it entirely, that every one should at least communicate at Easter, that is, once a year. This injunction was afterwards renewed by the council of Trent. For an ample account of the antient communion service, *Missa Fidelium*, as well as of the ante-communion service, *Missa Catechumenorum*, we refer to Bingham, vol. v. c. 1 to 9.

* In the universities, the vice-chancellor, as returning-officer, receives and returns the sheriff's precept of election.

There was one form for the clergy, a second for the laity (vol. vi. c. 2 and 3), and a third and lowest form for strangers or foreigners. Degradation of the clergy to the lay form of communicating in one kind, that is, with bread and no wine, appears to have been an antient mode of canonical punishment. (*Apost. Can.* c. 14.) The bread appears never to have been omitted: the difference between communicating under one or two species or kinds, as it is termed, being solely in the omission or inclusion of the wine. The communion in two kinds seems to have continued in the Latin church until the end of the 11th century; for in 1099 Pope Paschal II. decreed that little children only should omit the wine, and that the wine alone should be given to those who, from extreme illness, could not swallow the bread. After this period the custom began to prevail of taking the wine by sopping it into the bread instead of drinking it out of the chalice. A letter by Ernulphus, bishop of Rochester, who died in 1124, commends this expedient for several reasons, one of the quaintest of which is, to avoid the profanation of wasting the consecrated wine by the dipping of bushy beards into the chalice. The communion under one species, that is, with bread alone, was authorized in 1415 by a decree of the council of Constance, and was confirmed by the council of Trent in 1562: but, with the exception of the Latin church, all the various sects of Christians have retained the communion under two species. During the first seven centuries the mixing of water with the wine was very generally considered as indispensable to the proper and efficient performance of the eucharistic rite. Justin Martyr, in his 'Apology,' written probably about the end of the first or beginning of the second century, observes that the mode of communicating was with a chalice of wine and *water*. It is unnecessary to quote passages from the subsequent fathers in confirmation of this fact. They all appear to have believed the water to be an essential ingredient; and several (Cyprian, *Epist.* 63, and Athanas. *in Psal.* 74) assign as the reason of it, that the pure wine of the mystic chalice represents the unmixed nature of God; the pure water represents the nature of faithful Christians; and the commixture of the wine and water represents the union of God and the faithful. A decree of the Œcumenic council, A.D. 691, denounces the Armenians as heretics for celebrating the communion with wine unmixed with water; and the 32nd canon of the council of Trullo decrees the deposition of every bishop or priest who shall omit the water. From the writings of Germain, patriarch of Constantinople; of Cabusilas; of Simeon of Thessalonica; of Balsamon, patriarch of Antioch; of Goar, in his Euchologia; and from the Greek Ritual, it appears to have been a long established custom in the Greek church to dilute the eucharistic wine with *hot* water, and to administer the mixture hot. To these remarks on the matter of the eucharist, we may add that Epiphanius (*Hæres.* c. 49) and Augustin (*Hæres.* c. 28) speak of an antient sect of Christians in Phrygia, followers of Montanus, who were called Artotyrites (ἄρτος, τυρός), because, in the communion, they used not bread and wine, but bread and cheese. (Pluquet, *Dict. des Hérésies.*) Others, the followers of Tatian, in the second century, made use of bread and water without wine, and hence were called Aquarians, and Hydroparastai. (Epiphan. *de Hæres.* 47; Augustin *de Hæres*, c. 25; Cyprian, *Epist.* 63.) This sect is also spoken of by Clemens Alexandrinus, and Chrysostom, and in the fifth century it was revived, with a declaration of motives of sobriety. There appears to have been a custom of communicating with consecrated bread and milk, for it is condemned by the council of Braga, in Spain, A.D. 675. The prevalent report in the first centuries, that the Christians celebrated the communion with flour which was kneaded in or with bread which was dipped in the blood of infants, slain or punctured for this purpose, appears to be applicable only to the Christian sects included under the denomination of Gnostics and Montanists; at least several of the Catholic fathers, in repelling the accusation from the orthodox, distinctly fix it upon these heretical sects. (Epiphan. *Hæres.* 26 and 48; Philastrius, *Hæres. Bib. Patr.* tom. 4, p. 13; Cyril, *Catech.* 16, p. 178; Augustin, *Hæres.* c. 26; Tertull. l. 2, *ad Uxor.* c. 5; Baronius, *An.* 120-129.) Until the seventh century the communion bread was that commonly used for food; a particular kind began then to be prepared exclusively for the purpose, of a circular form, and impressed with the sign of the cross. The Greek church adopts a leavened bread, but the Roman church has it unleavened; and this difference has been the cause of much controversy, though it seems easy to decide which kind was used by Jesus, the last supper having been on one of the 'days of unleavened bread,' when no other kind could be eaten in the land of Judæa. It has been a subject of still greater contention whether the proper posture of communicants is that of sitting, reclining, kneeling, or standing. In the third century standing appears to have been the usual posture. See Euseb. *Hist.* l. vii. c. 9; Tertull. *De Orat.* c. ult.; Chrysost. tom. i., *Hom.* 22, p. 260, παραστῆναι τῇ ἱερᾷ τραπέζῃ. It is also a subject of dispute whether the antient Agapæ (αἱ ἀγαπαί), which some modern sects continue under the name of love-feasts, were identical with the celebration of the eucharist. Probably these friendly repasts, so zealously continued throughout the four first centuries, were commenced or terminated by the act of communion; for they often took place in the churches until A.D. 360, when they were excluded from the churches by the council of Laodicea, on account of their having become scenes of indecorous conviviality. Tertullian, in his *Apol.* c. 39, minutely describes the proceedings of one which was conducted with propriety. The fathers frequently speak of the consecrated elements being carried home by the communicants, who gave them to the sick, or kept them deposited in their coffers as a charm against evil spirits, or bore them as a viaticum about their persons in travelling, and in voyages by sea. (Cyprian, *de Caps.* p. 176; Basil. *Epis.* 289; Ambrose, *de Obit. Satyri*, t. iv. p. 315; Cyprian, *de Spectac.*, p. 292; Justin. Mart. *Apol.* 1; Baronius, *An.* 57, n. 151.) Among the many purposes to which the sacramental symbols have been applied, we may notice an instance related by St. Augustin (*Contr. Julian.* l. iii. c. 164) of a child born blind who was perfectly enabled to see, after his mother had put upon his eyes a poultice made of the eucharistic bread and wine. In the first centuries it was customary to bury the eucharist with the dead; and though, by the council of Carthage, A.D. 419, and the Œcumenic council in 691, the custom was condemned, it still continued to prevail; and St. Cuthbert and many others were entombed with the consecrated bread on their breasts, as a safeguard against the molestation of demons. To heighten the intensity of a solemn asseveration, a few drops of 'the vivifying blood' were sometimes put into the ink with which the signature was written. Thus, in the eighth council of Constantinople, all the bishops signed the deposition of Photius with a pen 'dipped in the blood of the Saviour.' Thus Pope Theodore signed depositions; and thus Charles the Bold signed treaties of peace. (Baronius, *An.* 648.) It appears to have been always required that, after the serving of all the communicants, any portion of the consecrated elements which might be left should be immediately eaten by the officiating priests; and by the council of Toledo, in 693, the consecration of a prudent and moderate quantity is enjoined, in order to prevent repletion from eating all that remained. Hesychius (in *Levitic.* l. 2, c. 8) says, that, in the church of Jerusalem these remnants were burned; and Evagrius (*Hist.* l. iv. c. 35) informs us that, in the churches of Constantinople, the priests sent for a school of children to eat up any large quantity of fragments. To the work entitled 'An Inquiry concerning Infant Communion in the first Ages of Christianity,' we must refer for information on that point of the subject (vol. ii. p. 75); and also to the Essays on the Eucharist, by Pierce and Waterland. In the fifth century the communion was sometimes administered by women, and they continued to officiate at the altar in Italy and France until after the tenth century. (Pope Gelasius, *Epis.* 9 *to Bishops of Lucania*; *Epis. Ratherius Bishop of Verona.*) In the second century the eucharist began to be celebrated in the churches with closed doors, with the exclusion of all but the initiated, on which the Pagan philosophers accused the Christians of having adopted the Eleusinian mysteries of Ceres and Bacchus, bread and wine. (Augustin. *Contr. Faustum*, l. xx. c. 13.) 'The fathers,' says the Rev. Mr. Abthorp (*Letters on Christianity*, p. 365), 'adopted the language of the Eleusinian mysteries, and most incautiously applied it to the Christian worship: especially to baptism and the eucharist.' Many learned writers have noticed some remarkable points of resemblance in the Eleusinian mysteries and the Eucharistic rites, such as their being commemorative, and designed to effect a moral regeneration (παλιγγενεσία), or new-birth. See Abthorp *ubi supra*; and Casaubon *in Baronii Ann. exercit.* xvi. p. 478. On the dif-

ferent sorts of communion, see Albaspinæus; Du Pin; Anton. Dominicus; and the very elaborate *Histoire de l'Eucharistie*, by l'Arroque.

COMNENI FAMILY. [ALEXIS COMNENUS.]

COMO, the province of, in the Lombardo-Venetian kingdom, is bounded to the north by the province of Valtellina, and the Swiss cantons of Grisons and Ticino, from which it is separated by several offsets of the Rhœtian Alps; to the west by the Lago Maggiore, which divides it from the Sardinian territory, south by the province of Milan, and east by that of Bergamo. The length of the province of Como, north to south, is about forty miles, from Mount S. Giori, on the frontiers of the Grisons, to the borders of the province of Milan, near Missaglia. Its breadth is very irregular. The east or larger division of the province incloses the whole length of the lake of Como, the Larius of the Romans, a fine piece of water, long, narrow, and tortuous, full of promontories, gulfs, and little bays. Its most northern extremity forms a sort of distinct lake, called Laghetto, which is joined to the other part by a narrow channel. At the junction of the Laghetto with the great lake, the Adda, coming from Valtellina, enters it on the east side. The lake then extends nearly due south for fifteen miles; after which it divides into two branches: one to the south-west, which is about eighteen miles in length, retains the name of Lake of Como, the city of that name being at the extremity of it; the other branch runs south-east for twelve miles, and is called Lago di Lecco, from the town of that name. The Adda issues out of the lake at Lecco. The breadth of the lake is very unequal; towards the middle, just above the separation of the two branches, it is about three miles, but in most other places it is only between one and two miles. Two ridges or projections of the Rhœtian Alps encompass the basin of the lake: one proceeding from the group of the Splugen runs parallel to the west bank, and divides it from the basin of the Lake of Lugano, the level of which is more than 200 feet above that of the Lake of Como. The highest summit in this ridge, called Monte S. Giori, or Iöri Berg, which rises on the north borders of the province of Como, and between it and the Canton Ticino, is about 9000 feet above the sea. The other or east ridge is an offset of the chain which divides Valtellina from Lombardy, and which forms a high summit to the north-east of the Lake of Como, called Monte Legnone, about 9000 feet, and then runs south, parallel to the east bank of the lake, dividing the province of Como from the Val Brembana, in the province of Bergamo. These two ridges sink lower and lower as they advance to the south, until at last both merge into the great plain of Lombardy. They send out many offsets towards the lake, forming transverse valleys, which are drained by numerous streams which empty themselves into the lake. The banks of the lake are one of the most delightful regions of Italy, the climate being mild and genial, the soil productive in fruits and vegetables, and the country studded with thriving villages, and fine villas or mansions of noble and wealthy families. Sailing up the lake from Como, we see a succession of villas on both banks, the Villa d'Este, those of Tanzi, Pasta (belonging to the celebrated singer of that name), the Villa Belvedere near Blevio, and those of Mugiasca and Passalacqua near Moltrasio. Opposite Moltrasio, and on the right or east bank, is the pretty village of Torno, and the villa called Pliniana, on account of the intermittent spring which Pliny the naturalist (ii. 103) describes, and which continues to exhibit the same phenomena, which are described also, though with some discrepancy, by the younger Pliny (iv. 30). The palace of La Pliniana was built about 1570, by Anguissola, one of the four nobles of Piacenza who murdered the Duke Pier Luigi Farnese, and threw his body out of the window of the ducal palace of Piacenza. Proceeding north we see on the right Palanza, Careno, and the fine cascade of Nesso, and to the left Brienno, with groves of laurel trees, Cologno, Balbiano, with the island called Comacina opposite to it, Lenno, Cadenabbia, and La Tramezzina, which last is a small district full of hamlets and country-houses, in one of the most delightful situations on the lake. The Villa Sommariva, a splendid mansion, with a gallery of good paintings, is in this neighbourhood. On the opposite side, on the promontory which divides the two branches of Lecco and Como, is Bellagio, where Pliny's seat, which he called Comædia, is believed by some to have been, on account of the gay appearance of the landscape. His other villa, which he calls Tragœdia, was probably at Lenno, on the west bank, where the landscape is wild and stern. (Valery, *Voyages littéraires en Italie*.)

At Bellagio is the Villa Melzi, once inhabited by the vice-president of the Italian republic in the first years of Bonaparte's dominion. Farther north on the east bank is a fine cascade, called Fiume di Latte, with a glass manufactory near it; next comes Varena, in a sheltered warm situation, where the olive, vine, and orange and lemon trees, and other southern plants are seen thriving. Higher up on the same side is Bellano, at the entrance of the Val Sassina; a district subject to very cold winds from the Alps. A wild romantic spot in this neighbourhood, where the stream Pioverna forms a cascade among the rocks, is called L'Orrido di Bellano. Farther north is Colico, from whence the high-road of the Stelvio, or Stilfser Joch, began, but it is now being continued as far as Lecco. A branch road strikes off to the left near Colico, leading by Chiavenna to the pass of the Splugen. Returning southwards by the west bank, we see Donaso, where the steam-boat from Como stops; Gravedona, a large village, with the vast marble palace of the Dukes d'Alvito; Dongo, with its iron mines and works; the castle of Musso, cut in the rock, where the Condottiere Gian Giacomo Medici of Milan, brother of Pope Pius IV., defended himself for eight months against all the forces of Francesco Sforza II., duke of Milan, whom he obliged at last to grant him 35,000 gold sequins, and a full amnesty, in 1532. Near Musso are quarries of white marble, which has been used for the cathedral of Como. Lower down are Crenna, Rezzonico (Rhœtionicum), and Menagio, another large village, from whence a road leads over the mountains to Porlezza, on the north extremity of the Lago of Lugano, which here protrudes into the province of Como.

In the triangle formed by the two south branches of the lake are two ranges of hills, one parallel to each branch, both meeting near Bellagio on the extreme point. Between these ranges is the valley called Assina, in which the river Lambro takes its source, with the town of Asso, the little lake of Sagrino, and two villages, with the classical names of Castel Marte and Proserpio. At the south entrance of the valley stands the little town of Erba, in the middle of a plain encircled by hills, the southernmost of which form the group known by the name of Colline di Brianza, which extend between the Lambro and the Adda, and on the borders of the two provinces of Como and Milan, to within a few miles of Monza. These are the nearest hills to Milan, and the favourite resort of the wealthy Milanese in the summer and autumn. They are full of mansions, country-houses and gardens, and cheerful villages, such as Merato, with a splendid villa of the Belgioioso family; Robiate, on Mount Robio, or Orobio, a name derived from that of the Orobii, the first known inhabitants of this region, and known for its good wine; Inverigo, with the fine rotunda of the marquis and architect Cagnola, and the palace Crivelli; Lurago, with the palace Sormanni; Galbiate, Brianzola, Monticello and Montebello, which was for a time the residence of General Bonaparte after his conquest of Lombardy in 1797. Near Erba are three little lakes, Alserio, Pusiano, and Annono, which are said to have once formed one lake, known to the antients by the name of Eupilis. On the banks of the Alserio are the villa Carcano, and that of Appiani, called Soldo. Parini, the amiable and moral poet of Lombardy in the last century, was a native of this district. The roads are good as in every part of Lombardy: they have been much improved of late years, considerable sums being devoted annually to this branch of administration. The communal, or cross-roads of the province of Como, cost in 1831, 268,000 livres; in 1832, 288,000; and in 1833, 252,000 livres. The length of roads repaired, or newly opened, in the province during those three years alone, was of about 200 miles. (Bollettino Statistico di Milano, 1835.)

The west division of the province of Como consists of the district of Varese and the east coast of the Lago Maggiore. Varese is a bustling town near the little lake of that name, in a fine hilly country, where some of the best silk in Lombardy is produced. This is another favourite place of resort of the Milanese, and is full of handsome country-houses. On a steep hill north of Varese is the sanctuary of La Madonna del Monte, to which the country people resort in the month of September. A road leads from Varese to Laveno, where boats cross over the Lago Maggiore to Pallanza, in the Sar-

dinian state, from whence a branch road joins the high road of the Simplon. On the Como side of the lake is Luvino, near the river Tresa, an outlet of the lake of Lugano into the Lago Maggiore. The district of Cuvio, or Valcuvio, not far from Luvino, has been lately drained of an extensive marsh. To the east of Valcuvio, and separated from it by a range of hills, is Viconago, on the west bank of the lake of Lugano, which on this side touches the province of Como, and where are lead mines and works. Towards the south end of the Lago Maggiore is the town of Angera, Anghera, or Angleria, the birth-place of Pietro Martire, who was employed at the court of Ferdinand and Isabella, and wrote 'De rebus Oceanicis et Orbe Novo Decades.' Going in a south direction towards the borders of the province of Milan, the hills gradually sink, and the southern verge of the province of Como merges into the great plain of Lombardy. The districts of Tradate and Appiano are situated at this end.

Upon the whole, the province of Como is one of the finest in north Italy. It is well cultivated, though not so fertile as the plain; it produces corn, wine, fruit, and silk. The lake abounds with fish, especially trout. The people are industrious, active, and ingenious: many distinguished artists and literary men have come from this province. Gian Battista Giovio has given a long list of them in his 'Dizionario degli Uomini Illustri della Comasca Diocesi.' A great number of young men from the mountain districts emigrate in quest of employment; many follow the trade of masons and lapidaries, as in antient times, when under the Lombard kings master-masons in Upper Italy were generally styled 'magistri Comacceni;' others go to various countries as pedlars, carrying barometers, spectacles, looking-glasses, &c., which are manufactured at Como.

There is hardly a district in all Italy that has been so often and so much celebrated in antient and modern times. The principal writers who have described the banks of the lake of Como, are the younger Pliny in his 'Epistles;' Paolo Giovio, 'Larii Lacus Descriptio;' his brother, Benedetto Giovio, 'Historiæ Patriæ;' Giambattista Giovio, 'Opusculi Patrii et Lettere Lariane;' Amoretti, 'Viaggio ai tré Laghi;' besides many others.

The province of Como contains twenty-six districts, namely, Como, first and second, Bellagio, Menagio, Porlezza, San Fedele, Dongo, Gravedona, Bellano, Laveno, Lecco, Oggiono, Canzo, Arcisate, Maccugno, Luino, Tradate, Appiano, Brivio, Missaglia, Mariano, Erba, Angera, Gavirate, Varese, and Cuvio. These contain, in all, 528 communes, and 362,000 inhabitants. (*Bollettino Statistico*, 1835.) The province is divided, for judicial purposes, into ten circondarii, with local magistrates; the civil, criminal, and commercial courts for the whole province are at Como. There are 456 elementary schools of the first and second class, attended by about 20,000 boys, and 80 female schools attended by 3130 girls, besides holiday schools, charitable foundations, and private schools authorized by the government. (*Report* of 1833.)

COMO, the capital of the province, and a bishop's see, is situated at the S.W. extremity of the lake, surrounded by hills, on which are several old castles, in 45° 48′ N. lat., and 9° 6′ E. long., 22 miles N. by W. of Milan, 16 S. by E. of Lugano, and 23 miles E. of the nearest point of the Lago Maggiore. The population of Como, with its suburbs, is 15,000. Como has a Royal Lyceum, a public gymnasium, besides a diocesan one for theological students, a college of boarders called Gallio, and an institution for female education under the direction of the nuns of St. Francis de Sales. There are besides, in the province of Como, six private gymnasia at Cernusco, Lombardone, Cugliate, Daverio, Incino, and Oltrona. (Serristori, *Saggio Statistico*, 1833.) The cathedral of Como, a structure of the middle ages, is reckoned among the fine churches of Italy. The exterior is cased with white marble. The church of St. Fedele is still older, and remarkable for its architecture. The palace of the Giovio family, called Ædes Joviæ, has a collection of antient inscriptions placed under its portico and round the court. A handsome casino, or literary club-house, has been lately built, which Valery says is superior to all the establishments of the same sort at Paris. (*Voyages Littéraires en Italie.*) The theatre is also a handsome building with a good façade. The Broletto, or old town-house, contains the public archives. The suburb called Borgo Vico, which stretches along the lake, contains several fine palaces of the nobility; that called dell' Olmo, belonging to the Odescalchi family, is the most remarkable. The Lyceum, a handsome building, erected in 1824, has a good library attached to it. On a hill south of Como, and near the road to Milan, is the old tower Del Baradello, in which Napoleone della Torre, the popular chief, and lord of Milan, being defeated by his rival, Ottone Visconti, in 1277, was shut up in an iron cage, in which he died after nineteen months' confinement. Como is the native country of the two Plinys, of Paolo Giovio, of Innocent XI. (Odescalchi), and of Alessandro Volta.

Comum is said to have been built by the Orobii, the oldest known inhabitants of the country. It was afterwards occupied by the Gauls with the rest of Insubria. In the year 196 B.C., M. C. Marcellus having defeated the Boii and the Insubres, occupied Comum. The place was afterwards ravaged by the Rhetians. C. Pompeius Strabo, father of the great Pompey, sent a colony to Comum, and Cæsar is said to have sent a fresh colony, among whom were 500 Greeks of distinguished families. It then assumed the name of Novum Comum. It has been remarked that many names of places in this neighbourhood seem to be of Greek derivation. Greek inscriptions have also been found. After the fall of the empire, Como passed under the Goths, Longobards, and Franks, and became at last an independent municipal community. It was one of the chief towns of the Guibelines in Lombardy, and as such quarrelled repeatedly with the Milanese, who took it after a long siege, and burnt it in 1127. It was afterwards gradually rebuilt where it now stands.

Como has several considerable manufactories of silks, and also of woollens. Of late years we have seen several new works from the Como press.

COMORIN, CAPE, the southern extremity of the peninsula of Hindustan, situated in the territory of the rajah of Travancore, in 8° 4′ N. lat. and 77° 37′ E. long., fourteen miles south-east from the town of Kotaur. It was noticed by Marco Polo in 1295 under the name of Cape Comari. The approach to this cape is unsafe for ships, on account of the many rocks by which it is surrounded. It is about 150 miles direct distance from the nearest point of Ceylon, and about 175 miles from Columbo.

COMORN (in Hungarian, Komárom), a county in the north-western part of Hungary, divided into two parts by the Danube, is bounded on the north-west by the county of Presburg. That portion which lies on the left bank of the Danube is perfectly level; but the other, on the right bank, is mountainous, owing to the interposition of the Bakonye and Vertes ranges. The Danube is joined by its northern arm close to the town of Comorn, after receiving the Neutra and Waag: the Dotis is another of the numerous streams in this county. Considerable tracts, which are now swamps, were cultivated and enlivened with villages in the time of Mathias Corvinus, king of Hungary. The soil is one of the most fertile in the kingdom, and well adapted for agricultural and grazing pursuits. The climate is salubrious. The surface available for production is estimated at 596,860 acres; of which 209,800 are employed as arable land, 32,100 as pastures, 16,300 as vineyards, and 221,280 are occupied by woods and forests. The whole area is about 1127 square miles. Large herds and flocks are reared, and there is a royal stud at Babolna: there is much game, and an abundant supply of fish. Beautiful marble is got at Tandos and Dotis, and the county also produces limestone, sandstone, and coal. It is divided into 4 circles, and contains 1 town, 6 market-towns, 81 villages, and 70 privileged settlements. The population is about 120,000, mostly Magyars, of whom the majority are Calvinists.

COMORN, the chief town, is a royal free town and fortress at the eastern extremity of the island of Schütt, opposite the efflux of the Waag into the Danube. It lies in 47° 45′ N. lat. and 18° 8′ E. long. The town is irregularly built, and the streets are dark and narrow; but it is well situated for trade, which it carries on to a great extent in grain, honey, wine, timber, and fish. It contains four Roman Catholic churches, of which that of St. Andrew is of considerable dimensions, two places of Protestant worship, a Greek church, and a synagogue; a council-house, town-hall, Roman Catholic and Protestant gymnasium, grammar school for the citizens, and hospital. It is the seat of the only native association for insuring the vessels which navigate the Danube and other Hungarian rivers, and their cargoes. To the east of the town, and at the point where the Waag

and Danube form a junction, stands the maiden fortress of Comorn, which is defended by extensive works and *têtes-de-pont* on both banks of the Danube; it was built by Mathias Corvinus, and has been rendered one of the strongest places in Europe by the additional fortifications commenced in 1805. The Danube is crossed at this spot by a flying bridge as well as a bridge of boats. Comorn contains about 1160 houses, and 17,500 inhabitants.

COMORO ISLANDS are situated in the channel of Mozambique, between 11° and 13° S. lat., and 42° and 45° E. long., about 150 miles from the coast of Africa, and somewhat more from the western coast of Madagascar. They are four in number; the largest, Comoro or Angazaye, which extends about thirty miles south and north, is very little known. The principal island is Anzuan or Hinzuan, where the sovereign who calls himself sultan resides: this is the only island visited by European vessels. [ANZUAN.] The third is Majotte, or rather Mayotte, which is said to have 1500 inhabitants. The smallest is Mohilla or Molalle. These islands have recently been often devastated by the Maratis, or inhabitants of the coast of Sekelava in Madagascar, who come over in large boats, besiege the fortified towns for months together, and carry away cattle and men. The population is said to have much decreased, and the smaller islands are nearly abandoned by their inhabitants.

COMPANIES, JOINT STOCK. [JOINT STOCK COMPANIES.]

COMPANIES, or GUILDS. [BOROUGH, p. 201; COLLEGIUM.]

COMPANY, in military affairs, is the body of men which constitutes one of the principal divisions of a battalion of infantry, and which corresponds to the troop in a regiment of cavalry. The strength of a company in the regiments of Guards and of the Artillery, is 120 men, but in the regular infantry, 100 men. In each battalion there is one which is denominated the grenadier company, and another bearing the name of the light company; and these are called flank companies from their stations, which, when the battalion is drawn up in line, are at its extremities. The grenadiers acquired that denomination from the grenades, or small shells, which they were appointed to throw by hand into an enemy's works; and the light companies were so called from the activity required in the men, who are frequently detached from the line in order to act as skirmishers, according to circumstances, about the battalion or brigade to which they belong. Every company of the line and militia is commanded by a captain, under whom are a lieutenant and an ensign, besides the non-commissioned officers; but in the regiment of artillery, the rifle brigade, and the corps of engineers and marines, each company has, instead of an ensign, a second lieutenant.

In France, the first formation of bodies of men under the denomination of companies, may be said to have taken place in 1373. [CAVALRY.] But the institution, in that country, of what approaches nearer to the present signification of the word, occurred in 1557, when Henry II. divided a French legion into fifteen bodies of 400 men; each of which, except the two first divisions or companies, was commanded by a captain, a lieutenant, and an ensign, besides two serjeants and eight corporals. Those two companies were considered as being immediately under the command of the colonel himself, and therefore had no officer of higher rank than lieutenant. This regulation seems to have been followed in the British service, since formerly in each regiment there were two, called the colonel's companies, which were commanded by lieutenants only, who, however, were by courtesy entitled captains.

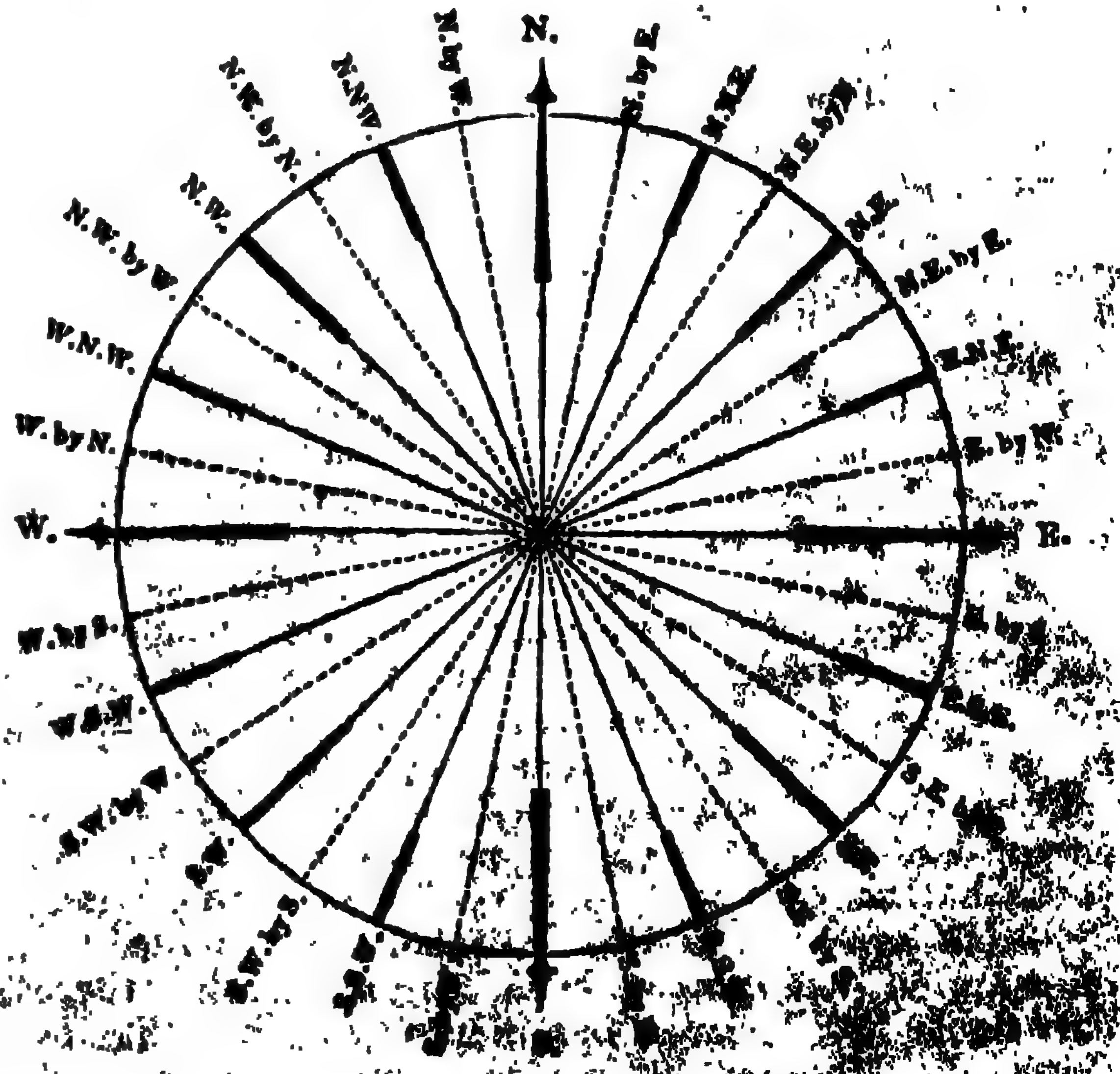
It is observed by Grose, that probably from the time of the Conquest the English infantry was divided into corps, consisting of 1000 men, which were subdivided into hundreds and tens. And he remarks that in the list of the army engaged at the siege and battle of St. Quentin in 1557, each company is stated to consist of 100 men, and to be commanded by a captain, a lieutenant, and an ensign, as at present, besides a serjeant, a harbinger, or quartermaster, and a drummer.

COMPASS, AZIMUTH, is a compass with plain sights, (generally vertical wires), attached to it in such a manner as to be moveable round a vertical axis independently of the compass-card. A pointer shows the angle which the position of the telescope, or sights, marks out on the card, that is, the bearing of the object towards which the sights are directed. This angle is the azimuth of the object, when the correction for magnetic variation is made. But when the bearings of two objects are measured, the correction need not be applied in merely determining the difference of bearings, since the error affects both equally.

The azimuth compass is a rough instrument, owing to the lightness and slender material of the compass-card, &c. When more exactness is required, a Theodolet, or some instrument of the kind, must be used.

COMPASS, THE MARINER'S. A magnetic needle balanced on a pivot, will, subject to a correction for the variation of the magnet, point out the true direction of north and south. A card bearing the points of the compass, and unalterably attached to any apparatus, such as a globe, will therefore afford the means of adjusting it north and south, if the centre of the card be made the pivot of a magnetic needle. In the mariner's compass, however, it is usual to affix the needle to the card, pointing towards its north and south point, so that the card travels with the needle; and if a pointer (fixed with respect to the ship), mark out the point on the edge of the card which lies in the line drawn through the pivot parallel to the plane which symmetrically bisects the ship, the bearing of the ship's head is shown by the part of the card to which the pointer directs for the time being. To insure the horizontality of the compass-card, the cylindrical box in which it is enclosed is supported in a hoop at opposite points, by pins projecting from it, so as to allow the box to revolve inside the hoop. This hoop is supported in the same manner on pivots, the line of which is at right angles to the first pivots; so that between the rotation of the compass-box in the hoop, and the hoop itself, the former can always find its position of equilibrium, which is the horizontal position. The small oscillations of the apparatus are immediately destroyed by the friction. The apparatus is then said to be supported on gimbles, or gimbals.

The notation of the mariner's compass is as follows: any point in the card being taken as north (marked N.), the opposite point is the south (marked S.), and the intermediate points are the east and west (E. and W.) The juxta-position of any two letters denotes the point which is half way between the points marked by these letters (N.E., N.W., S.E., S.W., north-east, north-west, &c., half way between north and east, &c.). The repetition of any of the preceding with any of the *cardinal* points (*cardo*, a hinge or pivot, points on which all the rest depend), has a similar meaning; thus E. S. E., or east-south-east, means the point which is half way between east and south-east. The intermediate points lie half way between the sixteen points hitherto explained: but instead of continuing the same notation, it is usual to express each by that one of the preceding points to which it is nearest, followed by the cardinal point towards which its departure from its nearest point leads it, the two being separated by the word 'by.' Thus the point half way between east and east-south-east, is east by south (nearest to east looking towards south). This admirable notation gives thirty-two points, as follows, which are sufficient for all purposes of description.



The distance between any two consecutive points subtends one thirty-second part of the circumference, or 11° 15′. This angle is called a point: and two objects, whose bearings differ by such an angle, are said to bear one point from each other. Thus a ship is said to sail within three points of the wind when the angle which her track makes with the line in which the wind comes is less than three times 11° 15′, or 33° 45′. The convenience of the preceding notation is combined with greater accuracy (the edge of the card being divided into degrees as well as points) by noting the number of degrees between the direction in question and the nearest point, together with the direction of departure. Thus E.N.E. 7° 21′ E., would imply a direction which makes an angle 7° 21′ with E.N.E., towards the east. If fractions be used, they mean fractions of a point: thus N.E. ¼ E. means a quarter of a point from north-east towards the east.

COMPASS, HISTORY OF THE. The knowledge of the directive power of the magnet was unknown to the Greeks, the Romans, and to European nations generally, till late in the twelfth century; and does not appear even then to have been brought into common use for nautical purposes. It has however been so known and so used in China, Japan, India, and Arabia from periods of high antiquity. Doubts, indeed, have been often expressed of the validity of the claims of the Chinese, and of the authenticity of the dates attributed to the notices of it in the grand annals of their empire: but the most careful examination of the Chinese claims does not warrant our scepticism on one point or the other. The Jesuit missionaries, who went to China in the beginning of the 17th century, were of course little likely to admit the high antiquity claimed by those annals without rigorous inquiry; nor without evidence of great force, to give up in any degree, even implicitly, the chronological authority of the Vulgate Scriptures: yet this was not only the case, but upon their return they unanimously agreed in the conviction that those records were authentic, and several of them published that conviction to the Catholic world, at no small degree of risk to their reputation for orthodoxy. No exact translation into any European language of the passages from which they drew their accounts of the directive properties of the magnet, had, however, been given till last year, when the lamented scholar Klaproth published his 'Lettre à M. A. Humboldt sur l'Invention de la Boussole,' at Paris; and a translation of the passage in question has been again given in English by Mr. Davies in his 'Early History of the Mariner's Compass,' just published in the 'British Annual for 1837.' The circumstance, from its incidental mention, seems to give greater authority to the passage. It relates to the date 2634 years before our æra.

'Houang-ti punishes Tchi-yeou at Tchou-lou.

'The Waï-ki said: Tchi-yeou bore the name of Khiang; he was related to the Emperor Yan-ti. He delighted in war and turmoil. He made swords, lances, and large cross-bows to oppress and devastate the empire. He called and brought together the chiefs of provinces: his grasping disposition and avarice exceeded all bounds. Yan-ti-yu-wang, unable any longer to keep him in check, ordered him to withdraw himself to Chao-hao, in order that he might thus detain him in the west. Tchi-yeou nevertheless persisted more and more in his perverse conduct. He crossed the river Yang-choui, ascended the Kieou-nao, and gave battle to the Emperor Yan-ti at Khoung-sang. Yan-ti was obliged to retire and seek an asylum in the plain of Tchou-lou. Hiuan-yuan (the proper name of the Emperor Houang-ti) then collected the forces of the vassals of the empire, and attacked Tchi-yeou in the plains of Tchou-lou. The latter raised a thick fog, in order that by means of the darkness he might spread confusion in the enemy's army. But Hiuan-yuan constructed a *chariot for indicating the south, in order to distinguish the four cardinal points*; by means of which he pursued Tchi-yeou and took him prisoner. He caused him to be ignominiously put to death at Tchoung-ki. The spot received, from this circumstance, the name of the plain of the broken curb.'

Other Chinese accounts vary as to language and as to circumstances relating to the personal character of Tchi-yeou; but they all agree in the statement respecting the *Tchi-nan* (or chariot of the south) being constructed by the emperor on that occasion; and it is remarkable that the very name by which the instrument is denoted, like every thing else Chinese, is retained almost unvaried from the earliest period of their history down to the present time.

Though numerous other passages of various dates speak equally explicitly of the use of the compass for land purposes, yet no mention of the use of the magnet for *navigation* occurs in any of their books that have come to the knowledge of Europeans, till the dynasty of Tsin, which lasted from the year 265 to 419 of Christ. It is in the great dictionary Poi-wen-yeu-fou; and it is there stated that 'there were then ships directed to the south by the needle.' Mr. Davies contends that this passage rather refers to the magnitude of their ships and the extent of the voyages which they performed, than to the introduction of the needle into marine affairs. In the ninth century, two Mohammedan travellers travelled into Arabia, an account of whose journey was published from an Arabic MS. (which bears internal marks of being written as early as the close of the eleventh century) by Eusebius Renaudot, at Paris, in 1718. In this it is stated that the Chinese at that period (the ninth century) traded in ships to the Persian Gulf and the Red Sea; and though the compass is not mentioned, it is utterly improbable that the Chinese should have known the directive property of the magnet, and have *used* it on land for thirty centuries, and yet not have employed it at sea. It was known on the Syrian coast before it had come into general use in Europe, as is obvious from the following passage from a MS. written in 1242, by Baïlak Kibdjaki, which is very explicit in its description of the nautical compass:—'We have to notice, amongst other properties of the magnet, that the captains who navigate the Syrian sea, when the night is so dark as to conceal from view the stars which might direct their course according to the position of the four cardinal points, take a basin full of water, which they shelter from wind by placing it in the interior of the vessel; they then drive a needle into a wooden peg or a corn-stalk, so as to form the shape of a cross, and throw it into the basin of water prepared for the purpose, on the surface of which it floats. They afterwards take a loadstone of sufficient size to fill the palm of the hand, or even smaller; bring it to the surface of the water, give to their hands a rotatory motion towards the right, so that the needle turns on the water's surface; they then suddenly and quickly withdraw their hands, when the two points of the needle face north and south. They have given me ocular demonstration of this process during our sea voyage from Syria to Alexandria in the year 640' (of the Hegira). An older passage than this might have been quoted, did the limits of our article allow of amplification; but this has been chosen on account of the distinctness of the description. When we consider the jealousy with which all knowledge was guarded by its possessors, especially that of *commercial* value, we cannot but admit that the use of the compass must have been very common at a period when a passenger was initiated into the complete knowledge of the mode of magnetising the steel needle, as well as the mode of using it.

In 1260, when Marco Polo returned from his travels in Cathaï, he is believed to have brought a knowledge of the compass, as well as other Chinese inventions, back to Europe with him; but there is no known authority for this opinion that can lay claim to authenticity. It is certain, however, that before the close of the fifteenth century, when Vasco de Gama found his way round the Cape of Good Hope, the pilots of the Indian Seas were expert in the use of sea-charts, the astrolabe, and the compass.

A passage extracted from the *Landnamabok* of Are Frode, who lived about the close of the eleventh century, has been brought forward by Professor Hansteen to prove the use of the magnetic needle for purposes of navigation at least as early as that date, in Norway: '*for in those times seamen had no loadstone in the northern countries.*' But this passage is most probably an interpolation by the continuator of the chronicle: which view is supported both by the remark of the editor, Finæus, of the chronicle itself, as well as by the circumstance of the whole passage not being found in three different MSS. Its authentic origin cannot reach higher than the fourteenth century. (*Brit. Ann.*, p. 296.)

The mariner's compass is however minutely described by Guyot de Provins, who wrote his satire entitled 'La Bible,' about the year 1190. This has usually been assumed to contain no indication that the mariner's compass was a recent discovery, or only little known in France at the time

of the composition of the satire; but Mr. Davies considers that the minuteness of the description itself, as well as other collateral evidence, proves clearly that it was an instrument at that time not only not much known, but a total novelty. Guyot, a minstrel by profession, had probably seen it in use during the crusades, to one of which most likely he had previously attached himself. At all events Cardinal de Vitry and Vincent de Beauvais, both Frenchmen, and both crusaders, writing at a later period by a quarter or half a century than Guyot, speak of it as a great curiosity which they saw in the east, and as a thing perfectly new in Europe would be spoken of. There is not hence the slightest foundation for the belief that it was used by European seamen at so early a period, though there can be but little doubt that by the middle of the thirteenth century it had come into partial use and into general knowledge; since, in one of the songs of Gauthier d'Epinois, is an *allusion*, which no one would have made had not his auditors been familiar with the magnetic needle.

Considerable doubts rest upon the character to be given to a MS. known as the Leyden MS. of Adsiger. This (which has been published by Cavallo in the supplement to his 'Treatise on Magnetism,' pp. 37—62), makes the compass known for *land* purposes in 1269, and, what is more remarkable, it does not appear to have been known to the writer, Petrus Peregrinus, as capable of use at sea, whilst its declination from the true meridian is distinctly expressed. Klaproth does not even mention this; Libri throws doubts upon the authenticity of the MS. itself; Windebanke has very recently published a commentary on it, which we have not seen; and Davies waives the discussion of it till a future period. Under these circumstances there can be no impropriety in leaving it as an open question; and we feel the more disposed to do this, as there is very clear proof that the needle was at least partially known in Europe before the period when that letter, *ad Sigerium*, was written; and moreover that it throws no especial light upon the progress of the improvement of the instrument.

It was long contended that the inventor of the compass as a *nautical* instrument was Flavio Gioja, a native of Amalfi, near Naples, and the date given by the Italians is from 1300 to 1320. It will be obvious from what we have already said, that there is no foundation for this opinion; and independently of this, the authority of the statements themselves are invalidated by an appeal to the facts which are affirmed in proof of it, as may be seen either in Klaproth's letter or in the 'British Annual.' Before this assigned period, even the *Trésor* of Brunetto Latini (the master of the Divine Dante) bears evidence that the compass was not a rarity. It is however highly probable that Gioja greatly improved the compass, either by its mode of suspension, or by the attachment of the card to the needle itself, or in some other important particular.

The French have laid claim to the discovery of the compass, or at least to the attachment of the card to the needle, from the circumstance of the north point being marked with the *fleur-de-lis;* but in the absence of all distinct evidence on this point, it is much more probable that the view taken by Mr. Davies is correct—that the figure is an *ornamented cross*, and originating in the devotion of an ignorant and superstitious age to the mere symbol. Or, again, he observes, as the compass undoubtedly came into Europe from the Arabs, the *fleur-de-lis* might possibly be a modification of the *mouasala* or dart, the name by which the Arabs called the needle.

The discovery of the variation of the needle was, generally, before the appearance of Cavallo's 'Treatise on Magnetism,' attributed to Columbus, and since that time it has been assumed as being very early known. [DECLINATION OF THE COMPASS.]

By whom the suspension, now generally used, was invented, is altogether unknown from any document, or other evidence. The suspension of the whole machine itself on two circles, whose suspending diameters are at right angles to each other, technically called gimbals (or jimbals), is however, on all hands, admitted to have been English, though we are still ignorant both of the person who invented it or the period of the invention. It appears to be traditional evidence on which the opinion rests; but a tradition in which rival nations agree, bearing on an invention which would be honourable to any one to have a powerful claim, can hardly be supposed an erroneous one. Still, even in England, in the time of Queen Elizabeth, the construction was very rude in its execution.

The dip of the needle, or its *inclination*, was also the undoubted discovery of an Englishman, Robert Norman, a nautical-instrument maker at Wapping, who published an interesting account of the course of his experiments in 1594, under the title of the 'New Attractive.' [DIPPING NEEDLE and MAGNETIC INTENSITY.]

The VARIATION OF DECLINATION is also an English discovery, being made, as is well authenticated, by Stephen Burrowes, of Limehouse, and fully determined by Gellebrand, professor of geometry in Gresham College; and the diurnal variation of the declination also unquestionably belongs to another Englishman, Mr. Graham, about 1719.

After the time of Norman, it appears to have been the general practice to follow his plan, that of suspending the needle by its mechanical centre of gravity, and when it was magnetised, bringing it from the natural magnetic position to a horizontal one by means of a counter weight, which could be slid along the needle to bring it to the required position. Few attempts of any moment were made till very recently to examine the magnetic conditions and changes to which the needle was subjected, or the advantages of one form of the needle itself over another. The only improvements were those which insured greater nicety of construction; and except in this respect, the needle was, at the beginning of the nineteeth century, in precisely the same state as it was three centuries before. The two chief improvements in the completion of a needle to be aimed at, besides its accuracy of suspension, were the symmetrical diffusion of the two opposite species of magnetism in the two arms of the needle, and the communication of the greatest total directive intensity to it as a whole. The method of effecting the first of these is generally conceded to be the method of double touch, invented by our countryman Michel; and on the latter the experiments of Captain Kater have been usually held to be decisive, although it does appear that the anomalous results which he obtained, so far as the *figure* of the needle is concerned, do not justify the inference that the question is properly decided. They however leave no doubt that the greatest directive power (whatever method of magnetising be employed) is given to the needle, which has been prepared by hardening it throughout at a red heat, and then softened from the middle to within about an inch of each end, till the blue colour which arises has again disappeared. (See *Phil. Trans.*, 1821.)

The iron employed so extensively in modern vessels has created great but generally unsuspected deflections of the magnetic needle from the position which under the influence of terrestrial magnetism only it would take in any given place and at any given time. Numerous vessels have been wrecked in consequence of this alone. Mr. Barlow invented a simple apparatus, which considerably diminishes the danger from this source, and this is the last improvement which navigation, so far as the compass is connected with navigation, has received. It is described under the head [CORRECTING PLATE]. The employment of so much *malleable* iron as is usual in vessels (especially steamers) does however threaten to render the compass altogether nugatory, as is shown in the place just referred to.

COMPASSES. This term we suppose to be synonymous with *compassers*, instruments by which we compass or go round a space. We shall here only give such a general notion of different kinds of constructions as will perhaps suggest the most convenient for any particular purpose.

1. Common Compasses, or Dividers.—There are simply two pointed legs on a common pivot, for transferring distances. For drawing a circle the lower end of one of the legs is removed, and its place supplied by a holder for a pencil, or by a steel pen.

2. Half Compasses.—One of the legs has a part attached to the upper part by a spring, so that by means of a screw a very small motion may be given to the lower end. It is convenient for very accurate dividing, but must be used with care.

3. Triangular Compasses.—These have three legs and two pivots, so that the three points of a triangle can be at once transferred. This is useful only in rough work, as the instrument is difficult to handle.

4. Proportional Compasses.—These consist of two dividing compasses with a common pivot, which, when open, present vertically opposite angles; consequently, the intervals between the points of one and the other are in the same proportion as the legs of one to the legs of the other. The pivot is a clamping screw, which can be transferred along the interval between the pairs of points, and a scale points out how to adjust the instrument to alter any line, or surface, or solid, in a given proportion. These compasses sometimes have an apparatus for slight adjustment; but on the whole we consider it as an instrument for rough work.

5. Beam Compasses.—This instrument is a cylindrical bar, perpendicular to which, with clamping screws, slide a point and a pencil. The use of it is to describe large circles, or measure large distances, the common compasses being very liable to slip when opened very wide. It is a very safe and sure construction.

6. There is a method of describing a small arc of a very large circle, as follows. An elastic rod of metal is furnished with a rigid bar, on which it can be drawn up by screws, so that the rod shall form an arc, the chord of which is a part of the bar. This may be adjusted so as to pass through three given points nearly in the same straight line, and though the curve then described by guiding the point of a pencil along the rod be not exactly an arc of a circle, yet, for all small flexures, it will come sufficiently near for practical purposes.

Many other species of compasses have been constructed, but these are all we have ever seen in use. [Calibre; Elliptic Compasses.]

COMPIEGNE, a town in France, in the department of Oise, on the left bank of the river Oise, just below the junction of the Aisne, and on the road from Paris to St. Quentin. It is 43 miles N.N.E. of Paris in a straight line, or 46 miles by the road through Senlis: in 49° 25′ N. lat. and 2° 49′ E. long.

Compiègne was originally a hunting residence of the kings of France, of the Merovingian and Carlovingian races. Charles Le Chauve founded here an abbey, and built two castles: the abbey with its church was rebuilt by Charles Le Simple. Several of the Carlovingian princes resided here, and some of them are buried here; but, under the third race, that of Capet, the town fell into some degree of neglect. In the contests of the Bourguignon and Armagnac factions, and in the wars of France and England, Compiègne changed hands frequently. It was in a sally from this place that Jeanne d'Arc was taken prisoner.

The town is agreeably situated, partly on the summit, and partly on the slope, of an eminence. The streets are badly laid out and the houses ill built, except in the neighbourhood of the château, where there are some good houses; there is a bridge over the river of three elliptical arches. There were formerly three parish churches, of which only one and a chapel of ease remain in use. The town-hall is a remarkable Gothic building, with a lofty tower rising from the roof.

A large and magnificent royal château was gradually rebuilt under Louis XV., according to the designs of the architect Gabriel. The gardens are more extensive than those of the Tuileries. This castle was the residence of Charles IV. of Spain, his queen and their suite, during the first part of their captivity in France, A.D. 1808. Here Napoleon and Maria Louisa, archduchess of Austria, first met on occasion of their marriage in 1810.

The population of Compiègne in 1832 was 8879. There are some manufactories of hosiery and cotton yarn, and a fine rope-walk; a number of boats, suited for the navigation of the Oise, are built here. There is a considerable trade carried on in corn and wood; the latter is sent to Paris by water carriage. There are a college or high school and a public library.

In the immediate neighbourhood of the town is a forest of considerable extent, used for the chase: this forest is attached to the château. A great quantity of wooden wares is made near the town for the supply of the neighbouring departments. The arrondissement of Compiègne contained, in 1832, 97,812 inhabitants.

COMPLEMENT, that magnitude which, with another, makes up a given magnitude. This is the general meaning of the word; but the most usual specific uses are as follows:—The complements of the parallelograms about the diagonal of a parallelogram: through a point in the diagonal draw parallels to the sides; the whole is then divided into two parallelograms on the diagonal, and two which only touch the diagonal at one angle. The latter pair are called by Euclid complements to the former.

The complement of an arc or angle is the arc or angle by which it falls short of a quadrant or a right angle.

The complement of a logarithm is the number by which a logarithm falls short of 10: thus comp. log. 2 is 10 − ·30103 or 9·69897.

The arithmetical complement of a number is the number by which it falls short of the next higher decimal denomination. Thus, ar. co. 936 is 1000 − 936, or 64; arith. comp. of 83 is 100 − 83, or 27. Beginning from the left, subtract every figure from 9, up to the last significant figure, which subtract from 10.

For the complement of life, see De Moivre's Hypothesis.

COMPLEXION. [Race.]

COMPLUTENSIAN POLYGLOTT. [Polyglotts.]

COMPO'SITÆ, the largest known natural order of plants, if, indeed, it is really an order, and not a group of a higher designation, consists of monopetalous exogens with syngenesious stamens, and an erect solitary ovule in a simple one-celled inferior ovary, the style of which is divided into two arms; the flowers are always arranged in dense heads, or capitula, and are surrounded by one or more external rows of bracts forming an involucre. Professor Lindley regards it as an alliance of several natural orders. It consists of herbs, shrubs, or trees, found in all parts of the world, but assuming an arborescent character only in warm latitudes: they occur in every conceivable variety of situation, are often exceedingly similar to each other in appearance, and have always been, from the birth of botany as a systematic science, the puzzle and reproach of systematists. Every succeeding writer, with a few exceptions, rendered the subject more complicated and difficult, till Cassini, a Frenchman, of good powers of observation, much patience in investigation, and a clear head, with the command of the rich materials included in the Paris herbaria, set steadily about a re-formation and re-examination of the whole order; he pointed out for the first time, that differences in the stigma are of primary importance in arranging these plants; he purged common genera of species wrongly referred to them; he boldly proposed the adoption of a host of new genera for the reception of those species, and he led the way to a logical and natural disposition of the previously unwieldy mass. Unfortunately, however, he was more skilful in separating than in combining; he stated the result of his investigations in a manner unreasonably prolix and wearisome, and he altogether failed in effecting any general reformation of the order; he was a mere man of detail. Improving upon the discoveries of Cassini, with far greater skill in forming combinations, and with fully as intimate a knowledge of the subject, the German botanist Lessing gave the world, in 1832, a synopsis of the genera of *Compositæ*, in which for the first time, a clear, compendious, intelligible view of the order was systematically taken; and his work will not cease for a long time to be a standard book of reference. But the arrangement of his matter was not favourable for comparative examination; the characters of his genera were too strictly differential for so difficult a group of plants; and moreover his style was disfigured by numerous unnecessary instances of troublesome neology. It is only within a few weeks before the appearance of this article that De Candolle, the celebrated botanist of Geneva, has achieved the difficult task of systematizing Compositæ in an unexceptionable manner. A profound master of his subject in all its bearings, with immense materials at his disposal, with a particularly clear systematic mind, and of a sound and solid judgment, he has reduced the whole subject to as satisfactory a state as any part of the vegetable kingdom. One 8vo volume of 700 pages, and containing about 4500 species, has appeared under the name of 'Prodromus Systematis Naturalis Regni Vegetabilis; pars quinta;' and the remainder, comprehending about as much more, is far advanced in the printing. It is probable that the changes in genera are too numerous in this work, as indeed is almost always the case when old enormous errors are suddenly and violently corrected; but such blemishes are hardly perceptible even to the critical eye, and are of no real importance to the general question.

The old and generally adopted plan of breaking up Compositæ into primary divisions, is that of Jussieu, which may

be explained thus:—Every head of flowers, or florets, as they are technically named, has a central part, or disk, and a circumference, or ray: of these florets some are regularly tubular, with their limb cut into four or five segments: others are slit up on one side, opened flat, and turned towards the circumference of the head; the latter are named ligulate florets. When in a head of flowers all the florets are alike and ligulate, it belonged to the division CICHORACEÆ, (*fig.* 1), as in the dandelion; if the florets of the disk were tubular, and of the circumference only ligulate, it was referable to CORYMBIFERÆ (*fig.* 2), as in the marigold; and when all the florets are alike tubular, both in the disk and ray (*fig.* 3), it belonged to CYNAROCEPHALÆ, provided the involucre was at the same time stiff and ovate, as in the thistle. The latter character was necessary in order to distinguish Cynarocephalæ from those Corymbiferæ in which the ray is not developed, as common groundsel. To these three divisions a fourth has in later times being added under the name of LABIATIFLORÆ, in consequence of the florets having distinctly two lips of unequal size (*figs.* 4 and 5.)



These divisions have however been thought objectionable on several accounts, and De Candolle, following Cassini and Lessing, has trusted more to modifications of the style: the result of which is the following arrangement of the order in eight tribes.

* Tubulifloræ; namely, with the hermaphrodite florets regularly tubular, and five-(seldom four-)toothed.

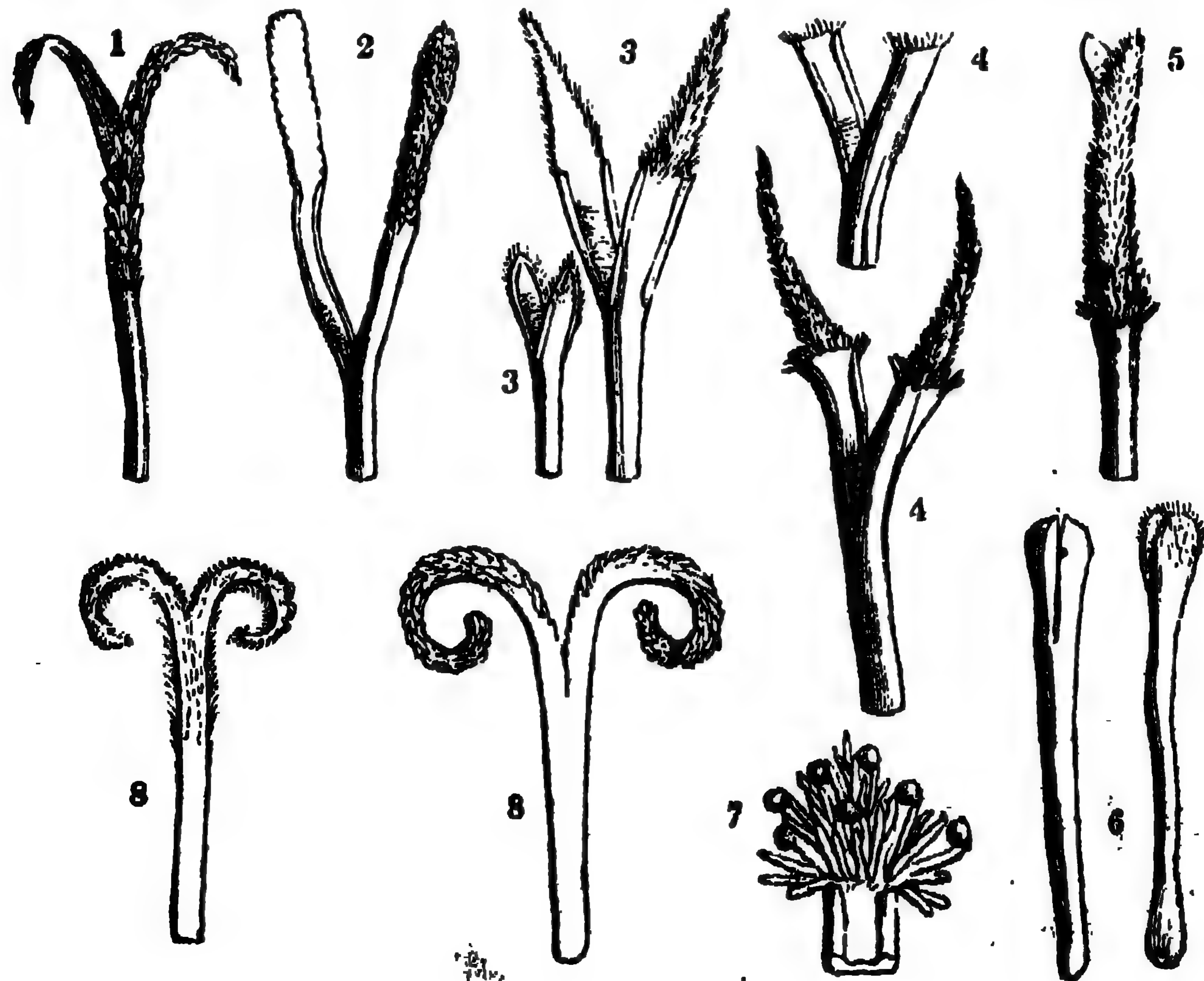
Tribe 1. VERNONIACEÆ. Style of the hermaphrodite flowers cylindrical, its arms usually lengthened and subulate, rarely short and obtuse, always equally hispid in about all the length. The true stigma ending short of the middle of the arms of the style. A part of the rayless Corymbiferæ. (*fig.* 1.)

Tribe 2. EUPATORIACEÆ. Style of the hermaphrodite flowers cylindrical, with long somewhat club-shaped arms, which are covered externally near the end with papillose down. The true stigma but little prominent, and usually ending short of the middle of the arms of the style. A part of the rayless Corymbiferæ. (*fig.* 2.)

Tribe 3. ASTEROIDEÆ. Style of the hermaphrodite flowers cylindrical, with linear arms, rather flat externally, and towards the end equally and finely downy. The true stigma produced about as far as the origin of the external down. A part of Corymbiferæ. (*fig.* 3.)

Tribe 4. SENECIONIDEÆ. Style of the hermaphrodite flowers cylindrical, with linear arms having a pencil of hairs at the point: either truncated, or produced beyond the pencil into a short cone, or a long narrow hispid appendage. The true stigma broad and prominent as far as the pencil. A part of Corymbiferæ. (*fig.* 4.)

Tribe 5. CYNAREÆ. Style of the hermaphrodite flowers thickened and knobby towards the upper end, and often



pencilled at the knob, the arms either distinct or grown together, and downy externally. The true stigma not prominent, reaching the apex of the arms, and then becoming confluent. All the Cynarocephalæ. (*fig.* 5.)

** Labiatifloræ, namely, with the hermaphrodite florets usually two-lipped.

Tribe 6. Mutisiaceæ. Style of the hermaphrodite flowers cylindrical at the upper end, or rather knobby, the arms usually obtuse or truncated, very convex on the outside, and at the upper part covered with minute even down, or naked. (*fig.* 6.)

Tribe 7. Nassauviaceæ. Style of the hermaphrodite flowers never knobby and thickened; the arms linear, rather long, truncated and pencilled at the point only. (*fig.* 7.)

*** Ligulifloræ, namely with all the flowers hermaphrodite and ligulate.

Tribe 8. Cichoraceæ. Style cylindrical at the upper end, with rather long arms, which are somewhat obtuse and equally hairy; the true stigma terminating short of the middle of the arms. (*fig.* 8.)

De Candolle estimates Compositæ at one tenth of the whole vegetable kingdom. They are in some cases soporific, as lettuce and succory; in others, they are diuretic, as various conyzas; some are tonic and stomachic, as wormwood and chamomile; but they are not of great medicinal importance to man, the last plants being the most valuable among them. Common artichokes with their succulent receptacles, and Jerusalem artichokes with their succulent tubers, are the only esculents. Many are beautiful objects to look upon, as dahlias, marigolds, coreopsis, asters, &c.

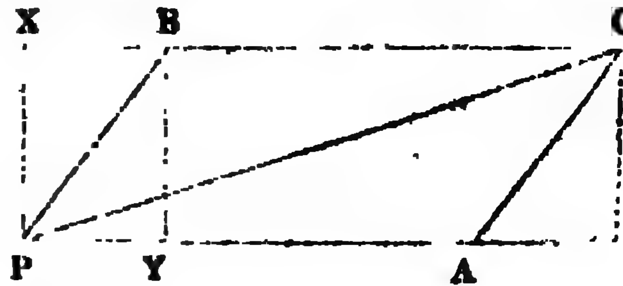
COMPOSITE ORDER. [Civil Architecture; Column.

COMPOSITION. In the gradual progress of mathematical language, this word has acquired a general meaning, as follows. Any one magnitude is said to be compounded of two others, when it produces the same effect as the other two put together. For instance, if we increase a length in the proportion of 3 to 7, and then increase the result in the proportion of 2 to 5, the original line is increased in the proportion of 3×2 to 7×5, or of 6 to 35. Hence the proportion of 6 to 35 is said to be the proportion compounded of (out of) the proportions of 3 to 7 and 2 to 5.

The effects of which it is in our power to form a distinct conception are of two kinds. 1. Those in which there are only two kinds imaginable, and those two diametrically opposite, with one neutral intermediate state. 2. Those in which the diametrically opposites have an infinite number of intermediate gradations. Loss or gain of money is an instance of the first; change of direction of the second. If, at the rate of an inch to a shilling, gains were measured northward from a given point, and losses southward, we could immediately make it a necessary consequence that the balance, if any, is represented by a line northward or southward, according as it is for or against. But draw a line eastward, and it will readily be admitted that such line will not present itself in any necessary connexion with a sum lost or gained, or neither lost nor gained. For if the latter, why should a line eastward be preferred to a line westward, or in any other direction?

An immense number of modes of composition will readily suggest themselves, in which addition and subtraction are the processes by which composition takes place. If I go three miles northward, and then two miles farther, I go in all $3+2$, or 5 miles northward. Other modes, as in the instance first given, will suggest themselves, in which multiplication and division are the compounding processes, and so on ad infinitum. These are all cases in which magnitude only is concerned; but whenever we have both magnitude and direction, it is plain that we have now both magnitude and direction to consider in the effect. If I go a mile northward and then a mile eastward, the whole effect, as to direction, will be, that I go to the north-east; as to magnitude, that I go not two miles, but only $\sqrt{2}$ miles, or 1·414 miles very nearly. Here is an instance in which the components are represented in magnitude and direction by two sides of a triangle, while the total effect is similarly represented by the third side. In the article Centre will be found various instances in which the meaning of that term implies the point at which a single action must take place, which will produce the same effect as a number of different actions produced on a number of points.

In mechanics, we have to consider the combined effects of different velocities, pressures, momenta, rotations, &c., communicated at the same moment of time to the same body. In all, the law of composition is found to be as follows—



In what sense soever the actions at P can be represented in magnitude and direction by P A and P B, in that same sense can the joint effect be represented by P C, the diagonal of the parallelogram, in both magnitude and direction: or P A and A C being the actions (A C being equal to P B in magnitude and direction), P C, the third side of the triangle, is the united action. Thus, if at the same instant we communicate motion to P in the directions P A and P B, with velocities P A and P B per second, we thereby merely communicate to P a velocity P C per second, in the direction P C. The same holds of momenta and pressures; and even if we give P two separate rotations, which would separately carry it round the axes P A and P B in angles per second which are in the same proportion as P A and P B, the joint effect is a rotation round the axis P C with an angle per second which is to the angle of P A (or P B) as P C is to P A (or P B).

We have here not to prove these things, but only to illustrate the word composition. But this we must remark, that our preconceived notions will never allow us to say that A is the effect of P and Q, and B of R and S, unless the application of P, Q, R, and S together will be the same in effect as that of A and B together. We shall show that this necessary condition of our notions of cause and effect is preserved in the method of composition just described. Let P X, B Y, and C Z be parallel to each other; then, if our law of composition be general, P B is the effect of P X and P Y. Therefore P X, P Y, and P A should be together equivalent to P C. But A Z is equal to P Y, and P Z is therefore equivalent to P A and P Y. Therefore A C should be the effect of P Z and P X, which we immediately see it is, being as much the diagonal of P X C Z as it is of P B C A.

As another, and a very curious instance of composition, we shall notice the following. Suppose x and y are to be measured, and both are subject to error, every error entailing loss in proportion to its magnitude, and causing equal loss, whether it be an error of excess or an error of defect. Suppose also that the errors are of such a kind that the average of any number of measurements is more probably right than any other. Let a and b be the sums which it would be equitable to pay for insuring x and y, that is, which should be given to any one who would agree to bear the loss on x and y separately. The sum which should then be given to one who would bear the total loss arising from the possible error in $x+y$ is not $a+b$, as might at first appear, but $\sqrt{a^2+b^2}$, or the hypothenuse of a right-angled triangle, of which a and b are as the sides.

Our limits will not allow us to enlarge on this subject we shall add the two following remarks.

1. The fact of the law of composition being the same both for velocities and pressures, has caused many writers on mechanics to confound the two, as if the one proved the other, which is neither true, nor even *very* probable. And other writers on mechanics, while proving this general law, that actions which can be represented by the two sides of a triangle produce an action which can be represented by the third side, have restricted the proposition, and seem to imagine that what they prove is true of *forces* only. This, with great deference to such a writer, we conceive M. Poisson to have done in the well-known proof at the beginning of his mechanics, a work which we may take this opportunity of saying, we hold in higher estimation than any other elementary mathematico-physical work whatsoever.

2. The difficulties of negative quantities in algebra arose from a want of generality, which gave rise to the attempt to express composition by addition only or by subtraction only, where either addition or subtraction might be requisite; and the difficulties of impossible quantities arose out of a similar deficiency, bearing the most complete analogy to trying to compound in magnitude only, in cases where both diversity of magnitude and of direction should have been considered.

COMPOSITION OF MOTION, of VELOCITY, of FORCE, &c. [Composition.]

COMPOST. [MANURE.]

COMPOSTELA, SANTIAGO DE, the capital of the province of Galicia in Spain, and an archbishop's see, is situated on a hill near the river Tambro, in 42° 52′ N. lat., and 8° 17′ W long. It has two collegiate churches and a number of other churches and convents. Besides the great hospital, which is one of the finest in Spain, there are other hospitals and asylums for orphans and the destitute of both sexes. The number of beggars in the streets is very great. The cathedral, dedicated to the apostle St. James, is above 300 feet in length, forming a cross, with seven gates, and twenty-three chapels, some of which are ornamented with marble, jasper, and other valuable stones. The church was once very rich in silver lamps and other ornaments, but the French carried off most of the plate in 1809. The chapter is numerous and wealthy, and the archiepiscopal see is one of the richest in Spain. Among the convents, those of San Francisco and St. Martin of the Benedictines are the handsomest. The principal square, called Plaça Real, and one or two streets, are good; but the rest are steep, narrow, and ill-paved. The situation of the town itself, surrounded by mountains, which leave it a very confined horizon, is gloomy, and the climate damp and cold in winter. The university has a good library, four colleges, and the faculties of theology, philosophy, law, and medicine. There is besides a diocesan seminary for clerical students. Compostela has a population of 28,000 inhabitants, among whom are many wealthy landed proprietors. It carries on a considerable trade, and has manufactures of paper, hats, leather, ribands, and lace. (Miñano, *Diccionario Geografico de España*.)

The Moors took Compostela A.D. 997, and set fire to it. They carried away the ornaments of the cathedral and its bells, which they took to Cordova, but they were restored by the king St. Ferdinand, after he took Cordova. In the middle ages, and even down to the last century, Compostela was a place of great resort for pilgrims from all parts of Europe, who repaired to the shrine of the apostle St. James, from whose name it is often called simply Santiago, or Santiago of Galicia. It is 40 miles S. by W. of Coruña, 300 N.W. of Madrid, and 24 miles E. of the nearest point of the sea, which is at the mouth of the Tambro, S. of Cape Finisterre.

COMPOUND, that which results from composition. [COMPOSITION.]

COMPOUND ADDITION, &c. [ADDITION, &c.]

COMPOUND FLOWERS are the flower heads of Compositæ; they are masses of small flowers collected upon a depressed axis, or receptacle, and surrounded by an involucre of floral leaves or bracts.

COMPOUND INTEREST. [INTEREST.]

COMPOUND QUANTITIES [ARITHMETIC], quantities in which more than one unit is employed, as in 2 pounds, 3 shillings, and 6 pence; 2 miles, 3 yards, and 4 inches.

COMPOUND RATIO. [COMPOSITION, RATIO.]

COMPRESSION. [EXPANSION.]

COMPURGATOR. In the middle ages a practice prevailed, derived from the canon law, of permitting persons accused of certain crimes to clear themselves by purgation. In these cases the accused party formally swore to his innocence, and, in corroboration of his oath, twelve other persons, who knew him, swore that they believed in their consciences that he stated the truth. These twelve persons were called compurgators. (Ducange *ad vocem Juramentum.*) This proceeding appears to have existed among the Saxons, and, in process of time, it came into use in England in civil cases of simple contract debts. [WAGER OF LAW.] The ceremony of canonical purgation of clerks-convict, which was nothing more than the formal oath of the party accused, and the oaths of his twelve compurgators, continued in England until it was abolished by the stat. 8 Eliz. c. 7. [BENEFIT OF CLERGY.]

COMTAT D'AVIGNON, LE, and LE COMTAT VENAISSIN, two small provinces in France, which up to the period of the French revolution, were subject to the pope, and are in most maps represented as one district, under the general designation of Le Comtat.

Le Comtat was situated between Provence, Dauphiné, and Languedoc. It was bounded on the north and northeast by Dauphiné, on the east and south by Provence, from which, on the south, it was separated by the Durance, and on the west by Languedoc, from which it was parted by the Rhône. Within these limits however was included also the principality of Orange, which was enclosed on three sides by the Le Comtat, but formed no part of it. Le Comtat is watered by various streams, the Ouvèze, the Auzon, the Nesque, the Sorgue, and others, which, uniting their waters, flow into the Rhône. The surface is not uniform; in the plains the temperature is similar to that of the neighbouring part of Provence; in the mountains it is colder: the banks of the Rhône and Durance are rendered less agreeable by the prevalence of north winds. The soil produces abundance of grain (especially excellent wheat), wine, and oil: many silk-worms are reared. There is little timber, but mulberry, olive, and almond trees are common.

The district includes some considerable towns, as Avignon, an archbishopric (population 25,956 for the town, 29,889 for the whole commune); Carpentras (pop. 6294 for the town, 9817 for the whole commune); Cavaillon (pop. 3845 for the town, 6911 for the commune); and Vaison—all these formerly were of episcopal rank: L'Isle (pop. 4717 for the town, 6052 for the whole commune); Pernes (pop. 3264 for the town, 4593 for the whole commune); Valréas (pop. 2883 for the town, 4348 for the whole commune); Bollène (pop. 2779 for the town, 4672 for the whole commune); Mazan (pop. 2670 for the town, 3851 for the whole commune); Malaucène (pop. 2209 for the town, 3069 for the whole commune); Monteux (pop. 2106 for the town, 4760 for the whole commune). Perhaps the population of the communes, which is greater in this district than in the rest of the department of Vaucluse (in which Le Comtat is now included), and the proportion which the rural population of each commune bears to that of their respective towns, may be taken as indications of the prosperity which the district enjoyed under the sway of its ecclesiastical rulers. Avignon was the capital of Le Comtat d'Avignon, and Carpentras of Le Comtat Venaissin.

During the sovereignty of the pope the government was in the hands of his vice-legate, who resided at Avignon; under him Le Comtat Venaissin was governed by a magistrate, called recteur. The dominion of the popes over Le Comtat Venaissin originated in 1273, when it was bestowed on Pope Gregory X. by Philippe III. *le Hardi*, king of France. Avignon was not acquired by the pontiffs till several years after. The whole is now comprehended in the department of Vaucluse. [AVIGNON; VAUCLUSE, DEPARTMENT OF.]

COMTE. [COUNT.]

CONCAN, NORTH AND SOUTH, a district of Bejapore, comprising the entire sea-coast of that province, and extending from the sea to the Western Ghaut mountains, which form its eastern boundary. Its length from north to south is about 220 miles; its breadth in no part exceeds 50 miles, and on the average is 35 miles. The district includes many fertile places, which yield abundant harvests of rice; but the surface is in general very rough, and much intersected by steep and rocky hills. Towards the ghauts the country is in most places extremely strong, being divided by hills, intersected by ravines, and covered with thick forest. The range itself is from 2000 to 4000 feet high, and exceedingly abrupt on the west: the passes are numerous but steep, and very seldom practicable for carriages. The table-land on the east is nearly as high as many parts of the ghauts, but in general the hills rise above it to the height of from 1000 to 1500 feet.

The northern part of the chain of ghauts and that part of this district which lies at the base is inhabited chiefly by Bheels. More to the south the country is inhabited by Coolies, who are less predatory in their habits and altogether more civilized than the Bheels: these latter, although they live quietly when in the open country, resume all their wildness in places that are strong either from hills or jungle. The Bheels are small of stature and black; they wear few clothes and are always armed with bows and arrows. In the hills both Bheels and Coolies live under Naiks or chiefs of their own, who in general have been little interfered with by the Mahratta government.

The northern Concan, which extends from the district of Surat on the north, or about 20° 20′ to about 18° 50′ N. lat., was ceded to the British by the Peishwa in 1817; and the Southern Concan, which extends further in the same direction to about 16 N. lat., was obtained partly by cession and partly by conquest from the same ruler in 1817 and 1818. A great part of the Northern Concan was once held

by the Portuguese, who divided the lands into large estates, which were given to Europeans, whose opulence is proved by the remains of many splendid public buildings and private dwellings which they erected, and some of which are now standing in places at present mere wastes.

The district is traversed by numerous mountain streams, but has no river of magnitude: it contains along the coast a great number of small bays and harbours, which, although they offer but little facility to commerce, serve to shelter pirates, who have always frequented this coast in great numbers. The land and sea breezes blow alternately during the twenty-four hours; the former are not felt at a greater distance than forty miles from the shore.

The Northern Concan is divided into 46 pergunnahs, containing 2111 villages and about 420,000 inhabitants. The Southern Concan comprises 47 pergunnahs and 2291 villages; and according to a census transmitted by the Bombay government to the directors of the East India Company in 1822, its native population amounted to 640,865 persons, of whom 597,150 were Hindus, 42,035 Mohammedans, and 1680 Portuguese and Jews, the descendants of former settlers. This population was composed of males under 12 years of age . 131,933

males under 12 years of age	131,933	
Above ditto	202,258	
		334,191
Females under 12 years	79,784	
Above 12 years	226,882	
		306,666
Total		640,857

The number of houses in this southern division was 131,621; the number of ploughs, 58,535; and of oxen and buffaloes employed in agriculture, 120,089. The amount of land revenue in 1829-30 was, in

Northern Concan	10,65,823 rupees,
Southern	10,55,421 ,,
Together	21,21,244
	or 212,124*l.*

The roads throughout the district are for the most part very indifferent, being little more than paths, excepting near the sea-coast, where, at some of the more difficult and precipitous places, steps of an easy ascent have been constructed, mostly at the expense of private individuals.

From reports made by the government collectors in 1828, it appears that there were in the Northern Concan 137 schools, in which instruction was given to 2678 scholars; and in Southern Concan, 282 schools, with 6721 scholars, being in the proportion of one scholar to 113 inhabitants.

(*Report of Committee of House of Commons on the Affairs of India*, 1832, *Political Revenue and Public Sections; Revenue Selections from Documents in the India House.*)

CONCAVE and **CONVEX—CONCAVITY** and **CONVEXITY.** A curve or surface is concave on the side on which straight lines drawn from point to point in it fall between the curve or surface and the spectator; that side is convex on which the curve or surface falls between such lines and the spectator. A surface may be either entirely concave, as the inside of a sphere, or entirely convex, as the outside; or concave in some directions and convex in others, as the surface of a dice box, or that made by the revolution of an hyperbola about its minor axis.

For the mathematical tests of convexity or concavity, see Curves, Theory of—Surfaces, Theory of—Point of Contrary Flexure.

CONCAVE LENSES. [Lens.]

CONCAVE MIRRORS. [Mirror.]

CONCENTRIC, having the same centre; thus concentric circles are those described about the same point.

CONCEPCION. [Chile, p. 64.]

CONCEPCION, a town of Chile, about seven miles from the shores of an extensive bay of the same name. It is situated on the north side of the river Biobio, and about a quarter of a mile from it; but during the floods the river washes the houses of the town. It occupies nearly a square mile, and is quite open, without any defences. Being built after the Spanish style, the streets cross each other at right angles with great uniformity. It has a fine open square, in which are the cathedral and the public buildings. The present site was chosen after the old city of Penco was destroyed by an earthquake in 1763, and Concepcion itself has frequently suffered from the same cause. In February, 1835, almost every house was thrown down; even the cathedral and a convent became a mass of ruins. At Talcahuano the sea is said to have risen 30 feet, and driven the vessels from their anchorage: in retiring it swept away the whole village. The population of Concepcion is estimated at about 7000. It has no manufactures and little commerce.

The bay, which is deep and commodious, is well sheltered by the fertile island of Quiriquina, which lies across the entrance with a safe channel on each side. At the head of the bay is the Puerto of Talcahuano, a small miserable town containing altogether about 1000 inhabitants, off which place ships generally lie. Along the shores of the bay are several villages, though the country is little cultivated. A bad sort of coal is found about Penco and Talcahuano. Refreshments of all kinds are plentiful; this district is indeed famous for its vines, grain, fruits, and esculent roots. Wine is made of an inferior quality, and arrow-root is raised. The bay abounds in fish: wood and water may also be had.

Talcahuano is about 240 miles to the south of Valparaiso, in 36° 42½′ S. lat., and 72° 57′ W. long. The tide rises about six feet. (Beechey's *Voyage to the Pacific*, &c.)

CONCERT, in music, a performance of several pieces of either vocal or instrumental music, but commonly of both, by different voices, and on various instruments. The earliest concert of which we find any record is that of the *Filarmonici*, at Vicenza, which must have been founded previously to 1565; for in that year another society, the *Incatenati*, was joined to it. But to England is due the credit of having instituted the first regular series of concerts, under the title of *The Academy of Antient Music*, which had its birth in 1710, and continued to exist upwards of eighty years. The *Concert Spirituel* of Paris was indebted for its origin to an elder brother of Philidor, the well-known composer and renowned chess-player, who in 1725 obtained a licence for the performance of sacred music during Lent. This proceeded without interruption till the French Revolution. The year 1776 is distinguished in musical history by the institution of the *Concert of Antient Music*, which became the asylum of classical compositions at a time when fashion threatened their extinction, and has ever since proved a school of music of inestimable value, by keeping alive a taste for the finest productions of the old masters. In 1791, Salomon, the celebrated violinist, commenced a series of subscription concerts at the Hanover-square Rooms, for which he engaged Haydn not only to write those twelve grand symphonies which are among the glories of the art, but to come to London to conduct their performance. These concerts went on till 1796; then ceased; and with them seemed to die away all relish for grand instrumental compositions. But in 1813, a party of eminent professors, with a view to rescue orchestral music of the highest class from the neglect into which it had fallen, formed themselves into a body under the title of the *Philharmonic Society*, and that season gave eight subscription concerts, the success of which, both as regards the main design and the support they received, was without any parallel. They constitute an æra in the art, and by their continuance act powerfully in promoting the advance of music.

Our space will only allow us to name some few other concerts which have risen up in the British metropolis, flourished for a time, then fallen to decay. Bach (John-Christian) and Abel in 1763 established subscription concerts, which have flourished for twenty years. These were succeeded by *The Professional Concert*, which, after a struggle, yielded to the enterprise and ability of Salomon. The *Vocal Concerts* of Harrison and Knyvett began in 1792 at Willis's Rooms, and were discontinued at the end of the season of 1794. They were revived in 1801 by Messrs. Bartleman, Harrison, Knyvett, and Greatorex, and conducted on a much larger scale. Their success at first was great, but they gradually fell off, and in 1821 were finally abandoned. In 1808 and two following years, Mrs. Billington, Mr. Braham, and Signor Naldi had subscription concerts at Willis's Rooms, and were opposed by Madame Catalani at the Hanover-square Rooms. In 1823, a weak and futile attempt was made to establish *British Concerts*, for the performance of music by native composers. Upon the same principle—absurd because exclusive—a concert was founded in 1834 under the name of the *Society of British Musicians*, the continuance of which has this year

(1836) been announced; but it has hitherto failed entirely in accomplishing its object. In 1833, a *Vocal Society* of thirty professional members sprang up at the Hanover-square Rooms, and gave six concerts, consisting almost entirely of vocal music, antient and modern, of every school. They are continued, and conducted on a principle so laudable that every lover of the art must feel an interest in their success.

CONCERT-PITCH, in Music, is the *pitch*—the degree of acuteness or gravity generally adopted for some one given note, and by which every other note is, of course, governed. *Concert-pitch* has frequently much varied, and musicians have hitherto made little if any effort to obtain a fixed standard, though so desirable, and so easily established.

CONCERTO, in Music (an Italian word adopted in our language), a composition in which many performers play in concert, *i. e.* in unison, but in which some one or two instruments take rather a more prominent part than the others. Such are the concertos of Corelli, Handel, Geminiani, Avison, &c. But from the latter part of last century the term has been applied to the species of composition written for one principal instrument, with accompaniments for a full orchestra. Of this description are the piano-forte concertos of Mozart, Dussek, Cramer, Beethoven, &c.; and the violin concertos of Viotti, Rode, &c. It must be observed, however, that in the concertos of Mozart and Beethoven the orchestral parts are so full, so essential, that those compositions may, if the expression is allowable, be designated as symphonies with a piano-forte part *obbligato*.

CONCHA'CEA, M. de Blainville's eighth family—M. Rang makes it the ninth, and places it in the second division, Dimyaires, containing those families which have two muscular impressions in each valve of his third order (*Lamellibranchiata*) of his third class (*Acephalophora*) of *Malacozoa*, or mollusks The following is De Blainville's definition of the family. *Mantle* closed before (en avant), above, and behind, where it is prolonged by two tubes more or less long, extensile, and either separated or united; abdomen constantly provided with a foot of slightly variable form, serving for locomotion. *Shell* nearly always regular, entirely closed, equivalve; umbones curved forward; hinge dorsal, complete, that is to say, with teeth and a ligament; this last either external or internal, short, and swollen (bombé); two distinct muscular impressions united below by a *ligule* more or less large, and very often inflected or returning backwards (rentrée en arrière).'

'All the animals of this family live plunged more or less deeply in the sand or in the mud, but they are still able to come out of it sometimes.'

M. Rang thus modifies De Blainville's definition, principally for the introduction of Iridina (which according to the observations of M. Deshayes could no longer be retained among the *Submytilacea*) and *Gratelupia*, a fossil species.

'*Mantle* closed, furnished with a considerable antero-inferior opening, for the passage of a foot, and presenting two posterior tubes more or less elongated, extensile, united or separated longitudinally, the lower one serving for respiration, and the upper one for dejections. *Shell* equivalve, generally regular, rarely gaping; umbones more or less curved forwards; hinge almost always with teeth; ligament short and swollen, internal or external; muscular impressions very distinct; united by a pallial impression more or less excavated posteriorly.'

'Animals marine, rarely freshwater.'

Cuvier (last edition of *Règne Animal*), at the foot of his definition of the *Cardiacea*, the fourth family of his *Testaceous Acephala*, has the following note. 'M. de Blainville en fait la famille des *Conchacées*.' The following is Cuvier's definition of his *Cardiacés*. 'Mantle open in front (par devant), and, moreover, with two separate openings, one for respiration and the other for the excrements, which are prolonged into tubes sometimes distinct, sometimes united into a single mass. There is always a transverse muscle at each extremity, and a foot which, most frequently, serves for creeping. It may be regarded as a sufficiently general rule, that those which have long tubes live plunged in the mud or sand. One may recognize on the shell this condition of organization by the more or less developed contour (contour plus ou moins rentrant), which the impression of the attachment of the borders of the mantle describes before uniting with the impression of the posterior transverse muscle.'

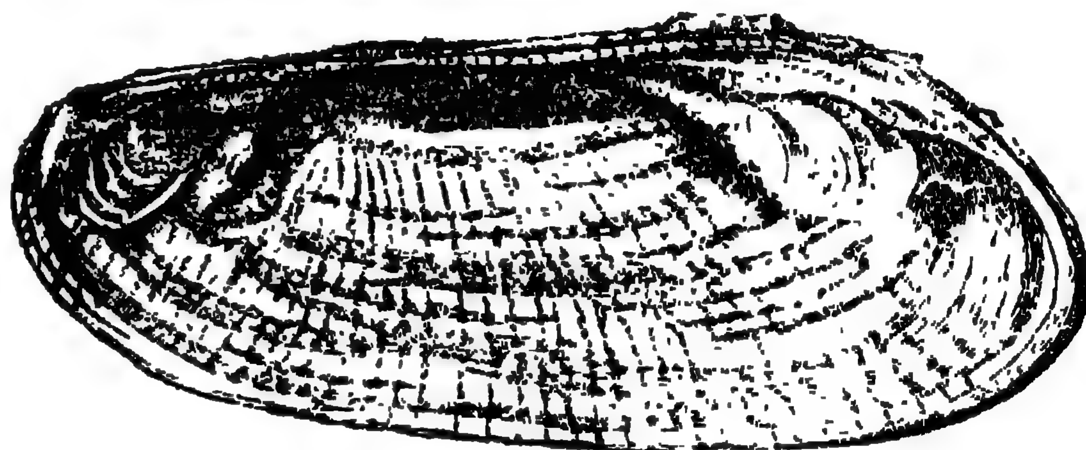
These definitions appear contradictory, but in reality they are meant to convey the same ideas. The mouth is placed anteriorly, the foot is exserted inferiorly, and the tubes open posteriorly.

*

Hinge linear and toothless—freshwater. (Rang.)

Genera. Iridina.

Animal elongated, straight, rather thick on the back, thinner towards its inferior border; mantle delicate, terminated anteriorly by a thick border, open from the anterior muscle to two-thirds of the lower border for the passage of the foot; borders of the mantle united throughout the whole posterior part, whence spring two short and unequal tubes, with no retractor muscle to the siphons; foot compressed and sharp-edged. *Shell*, with an epidermis, nacreous or iridescent internally, tolerably thick, oval oblong, elongated, inauriculated, equivalve, inequilateral, the anterior end shorter than the posterior, a little gaping at either end; umbones small and projecting but little, slightly inclined; hinge very long, linear, attenuated towards the middle, often crenulated, as it were, throughout its length; ligament very long, marginal, external; muscular impressions very distinct. Example. *Iridina exotica*, Lam., *Irid. elongata*, Sow.



[Iridina exotica, one-third of natural size.] (Sow. Gen., No 7.)

Lamarck gives the rivers of warm climates as the locality. The specimens were supposed to come from China. M. Caillaud found them in considerable abundance in the Nile; and from his specimens preserved in spirit M. Deshayes made his examination. Mr. G. B. Sowerby figures another which he considers to be a new species (*Zool. Journ.*, vol. i., tab. 2), and describes it (p. 53) under the name of *Iridina Nilotica*, obtained from Sennaar by M. Caillaud, and sent to England by M. D'Audebard. It very much resembles the species given here as an example, but its hinge margin is not crenulated or dentated. M. Deshayes, in his last edition of Lamarck, makes it identical with *Iridina exotica*, Lam. and Desh., *Anadonta exotica*, Blainv., and *Le Mutel*, Adanson.

**

Hinge with teeth.

a

Regular; hinge-teeth lateral and wide apart (marine).

Cardium (Cockle).

Animal very much rounded, having a very large cylindrical foot with a subconical termination, bent, elbow-like, about the middle, and directed forwards. The lobes of the mantle, which is bordered inferiorly by tentacular papillæ, are united posteriorly; but in the commissure, instead of elongated siphons, there are only very short ones; sometimes mere perforations in lieu of them: these are ciliated on their edge like the siphons are at their free extremity. Those parts are so short that they are without proper retractor muscles; whence it happens that the pallial impression in the shell is simple. Mouth transverse, infundibuliform, with small triangular appendages; gills short, unequal, joined upon the same line. *Shell* very much rounded, often subglobular, subcordiform or heart-shaped, equivalve with radiated ribs; borders of the valves toothed, or plaited, umbones a little curved forwards; hinge formed by four teeth in each valve, two cardinal, oblique, and two lateral and distant; ligament posterior and very short.

Geographical Distribution.—Very wide. Mr. Gray records a species, *C. radiatum*, brought home by Captain Parry (*Supplement to Voyage of* 1819–20); and the seas of almost every warm and temperate climate abound with them.

Habits.—The genus is generally found buried in sand near the shore. It has been observed in mud and gravel at depths varying from the surface of the sea to thirteen fathoms. By means of its large and long elbow-like foot it can leap well.

The species are numerous, and some grow to a very large size. M. Deshayes in his edition of Lamarck gives forty-eight, including *Hemicardium*; a form which Cuvier proposes to separate from the others, comprehending the species with compressed valves strongly carinated in the middle; observing that it is difficult to suppose that the animal is not modified in unison with this singular conformation. M. Rang corroborates Cuvier's observation, from the examination of many living individuals of *Cardium Cardissa*, the type; but M. Deshayes considers that the form can only be admitted as a section.

De Blainville divides the genus into the following sections.

1.

Species more or less gaping posteriorly, and with the ribs of the shell as large as the channellings. Example. *Cardium exoticum.*

2.

Species not gaping, and with the ribs as large as the channellings. Example. *C. tuberculatum* (but see below).

3.

Species not gaping, with the ribs larger than the channellings. Example. *C. edule.*

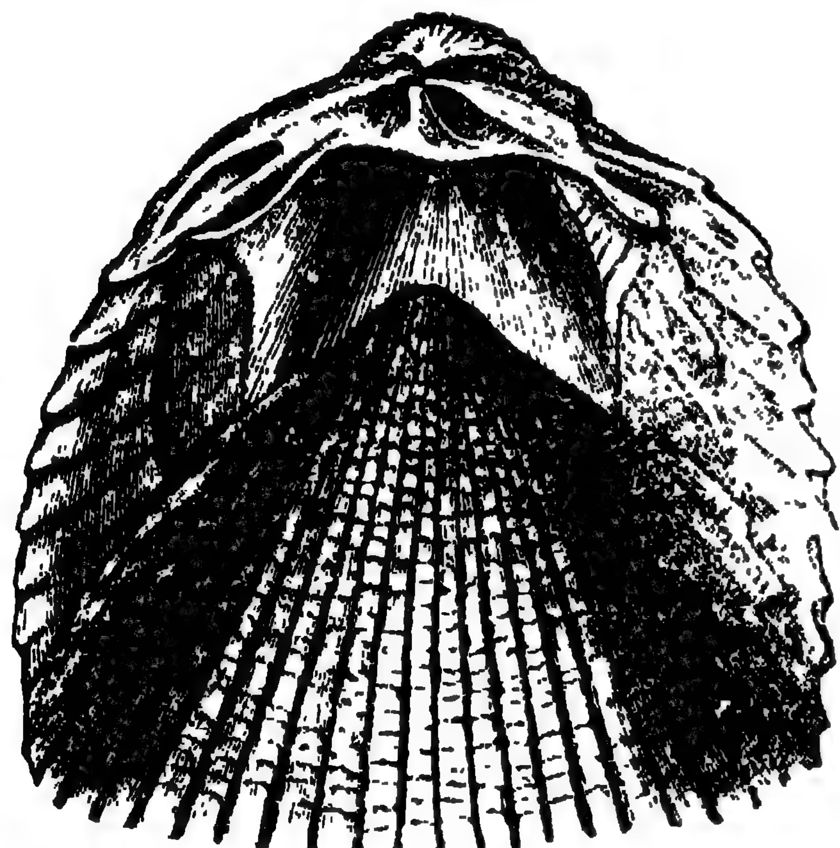
4.

Smooth, or almost smooth species. Example. *C. lævigatum.*

5.

Species whose anterior side is very short, and nearly flat. Example. *C. Hemicardium.*

Mr. G. B. Sowerby has added fourteen new species, and Mr. Broderip one, brought home by Mr. Cuming. (*Zool. Proc.*)





2

1. Hinge of Cardium lævigatum, natural size. 2. Cardium (Hemicardium) Cardissa, natural size; spotted variety.

Fossil Cardiadæ.

M. Deshayes in his tables gives fifty-three living species and thirty-nine fossil (tertiary), and *C. ringens, ciliare, echinatum, sulcatum, edule, tuberculatum,* and *planatum,* as both living and fossil species (tertiary). Of the recent species M. Deshayes, in his edition of Lamarck, where they are given as forty eight, considers *Cardium Indicum, C. ringens, C. echinatum* (of which last he makes *C. tuberculatum* to be only a variety), *C. sulcatum,* and *C. edule* (common cockle) as identical with fossil species described by Brocchi and others under different names. The fossil species he makes amount to thirty. Of these he refers *C. echinatum* to its living analogue, *C. Burdigalinum* to the recent *C. Indicum, C. rhomboïdes* to the recent *C. edule,* and considers *C. diluvianum,* Lam., as identical with *C. hians,* Brocchi. The fossils occur in nearly all the fossiliferous strata from the Supracretaceous to the Grauwacke group, and appear to be most abundant in the crag, London clay and green sand, and the contemporaneous beds. *Cardiola,* Brod., was found by Mr. Murchison in the Lower Ludlow rock, *i. e.*, the lowest part of his first or uppermost *Silurian Formation.*

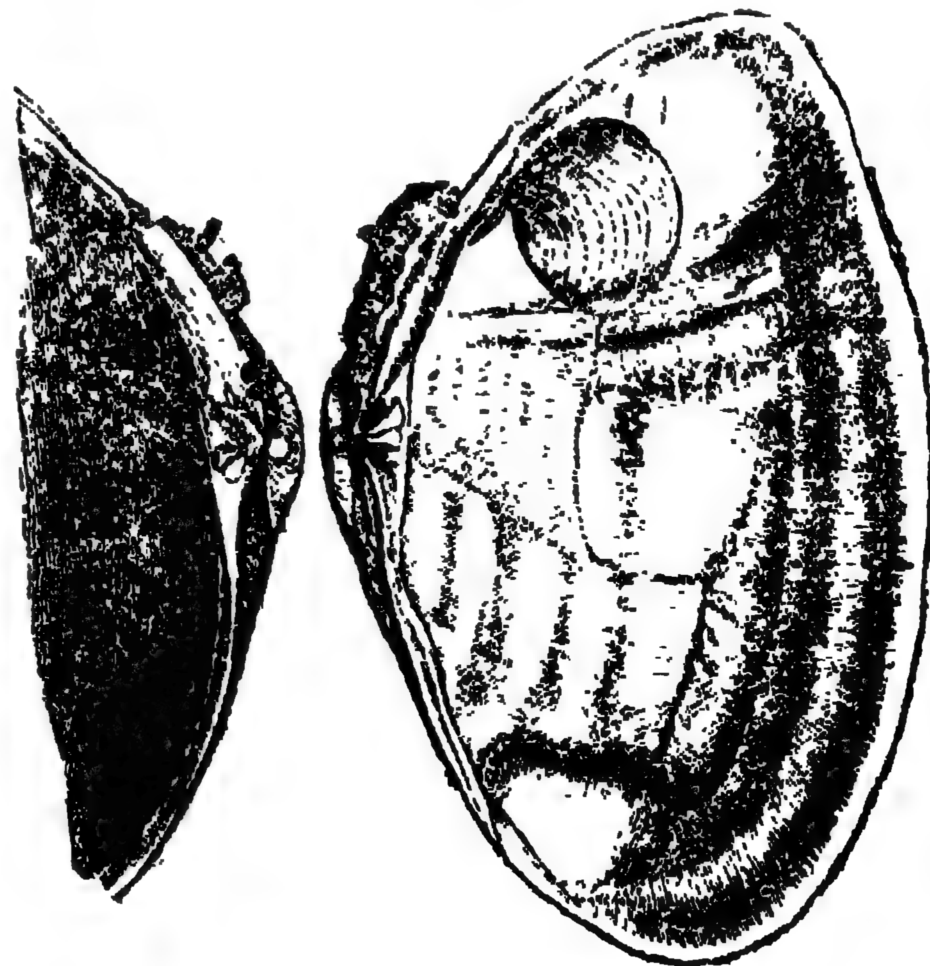
Capsa.

Animal with the mantle considerably open at its antero-inferior border for the passage of a compressed and very large foot: tubes separated and of considerable length, with tentacular papillæ at their orifices. Shell transverse, equivalve, inequilateral, not gaping: cardinal teeth diverging from a point close to the umbo, no lateral teeth in one valve, in the other, one distinct bifid cardinal tooth, and two distant very obsolete lateral ones; ligament external on the anterior side of the umbones; a large sinus in the pallial impressions.

Geographical Distribution.—Temperate and warm seas.

Habits.—Buried at a small depth in the sand, where they are said to lie with the posterior part upwards to facilitate the influx of the water for respiration. The genus has been found in sandy mud and soft mud, at depths varying from five to twelve fathoms from the surface of the sea.

Mr. G. B. Sowerby considers, that of the two species *C. lævigata* (*Donax lævigata*), and *C. Brasiliensis,* now remaining in the genus which he says appears to have been instituted by Lamarck in his Système, adopted by Bruguière in the 'Encyclopédie Méthodique,' by De Blainville in the 'Dictionnaire des Sciences Naturelles,' and other authors, the second is figured among the *Donaces* by Bruguière: they are, he adds, very nearly related to *Donax,* but the characters of the hinge, and the absence of crenulation round the edge of the valves, will serve to distinguish them. M. Rang observes, that they approach *Donax* so closely, that the example of M. de Blainville in uniting the two may be followed. Mr. G. B. Sowerby says, that *Donax complanata,* Mont., is the only English *Capsa* with which he is acquainted: and that the genus differs from *Sanguinolaria* in not gaping, but resembles it very much in the hinge teeth. M. Deshayes remarks, that Bruguière was the founder of the genus *Capsa,* and that he assembled under it the shells to which Lamarck has since given the name of *Sanguinolaria,* and some others belonging to the *Tellinæ.* When, he adds, Lamarck dismembered the genus, he should not have retained the name of *Capsa,* on account of the confusion consequent on the application of it to shells which Bruguière placed among the *Donaces.* M. Deshayes only records two species, *C. lævigata* (Lam.) and *C. Brasiliensis* (Lam.), in his edition of Lamarck, and is of opinion that the genus should be altogether suppressed and referred to *Donax.* Mr. G. B. Sowerby has added a new species, *C. altior,* brought home by Mr. Cuming. (*Zool. Proc.*)



[Capsa Brasiliensis.

Donax.

Animal rather compressed, more or less triangular, having the mantle bordered with tentacular appendages; labial appendages large; mouth small; branchiæ very unequal, on the same side; foot compressed, trenchant, angular; tubes separate and elongated, returning into a sinus of the mantle.

Shell more or less triangular and compressed, always longer than it is high, regular, equivalve, very inequilateral, posterior side shorter than the anterior; umbones but little prominent, [illegible] of two cardinal teeth [illegible], sometimes upon one only, and [illegible] teeth more or less distant; ligament external, short and swollen; muscular impressions rounded, united by a pallial impression, which is straight and very much excavated posteriorly.

Mr. G. B. Sowerby observes, that Lamarck is at issue with himself, when he calls the ligament posterior in *Donax;* for the sake of [illegible], we must continue to call the side on which the ligament is placed, as well as the sinus in the muscular impression of the mantle, whether it be the shorter or the longer, the anterior side. We are aware that Cuvier has pointed out the impropriety of this; but the term anterior is generally adopted for the side which bears the ligament, and posterior for the opposite side.' M. Deshayes, in his edition of Lamarck, well observes, that the terms anterior and posterior, as used by that zoologist, are badly applied, and that it must not be concluded, as some have done, that the *Donaces* and *Tellinæ* have the ligament on the anterior side. Adanson, he remarks, has doubtless assisted in confirming the error, that the former have the ligament placed on the anterior side; for, probably through inadvertence, in representing the animal of a *Donax* which he names *Pamet*, he makes the foot protrude from the short side which bears the ligament, and the siphon from the long side; but, argues Deshayes, all the *Donaces* examined have the siphons coming out of the shorter side of the shell. The presence of the siphons in a great number of the conchiferous mollusks, is indicated on the shell by a more or less deep sinuosity of the pallial impression, and this sinuosity directed posteriorly shows the position and the direction of the siphons; and in Adanson's figure this sinuosity is seen on the short side, showing that the siphons there come out, and not the foot, as the neighbouring figure would indicate. The consequence, concludes M. Deshayes, is that the *Donaces* come within the rule common to the *Conchifera;* the ligament is on the posterior side where the siphons are protruded.

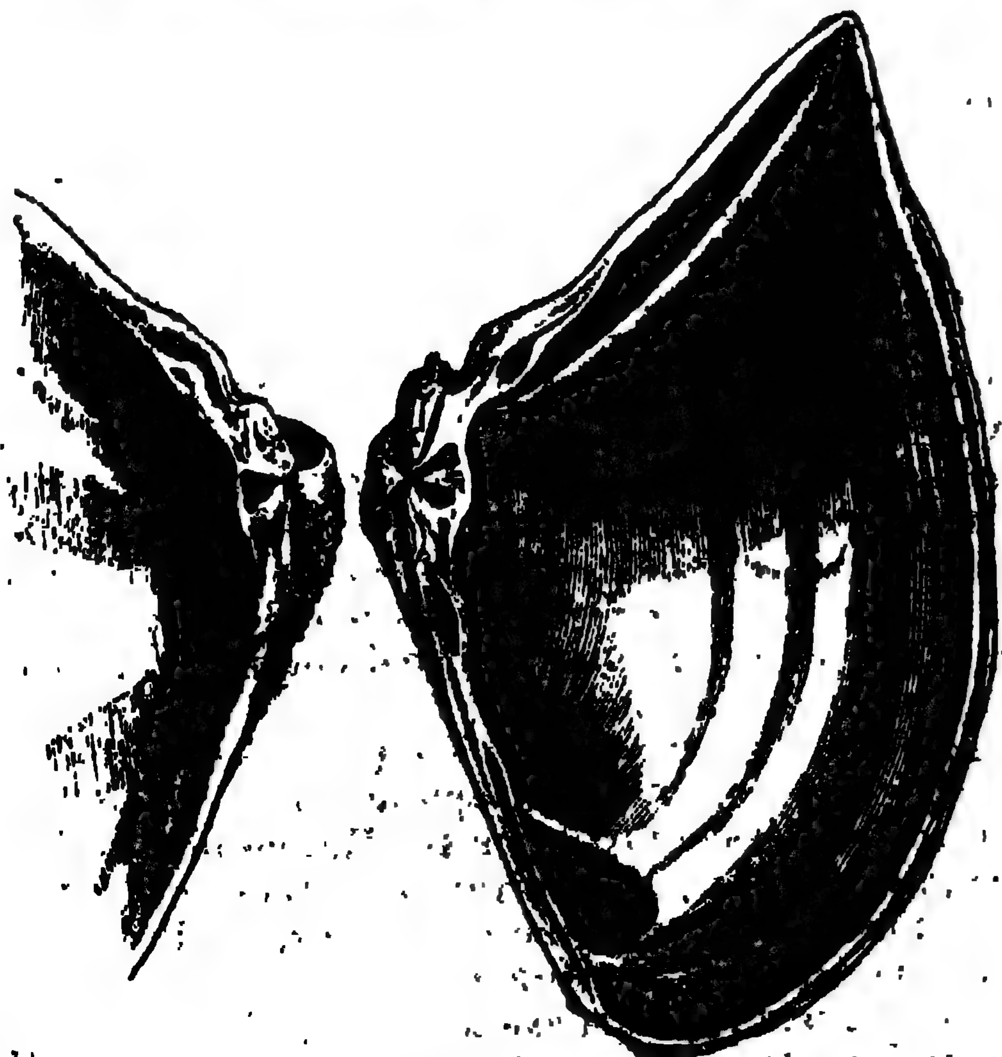
Geographical Distribution.—Widely extended. De Blainville says that the species occur in all parts of the world.

Habits.—Plunged in sand and sandy mud, where the animal lies with the short side of the shell uppermost, at a depth ranging from the surface of the sea to ten fathoms.

The species are numerous. M. Deshayes, in his tables, enumerates twenty-nine living, and in his edition of Lamarck thirty of these. He considers *D. pubescens*, Linn., as having been established on a young individual of *D. Scortum; D. granosa,* Lam., as a variety of *D. cuneata, D. triquetra,* as approaching nearer to the *Cytheræa* than the *Donaces; D. ringens,* as belonging to the genus *Capsa*, Lam., if Lamarck's characters are rigorously followed; *D. cardioides* (the animal), as a proper subject for study, as it is very probable that it does not belong to the *Donaces;* the pallial impression is not notched posteriorly, and the hinge comes nearer to that of *Cardium medium* than those of the *Donaces;* and *D. Meröe* and *D. scripta*, as having more of the characters of *Cytheræa* than *Donaces.*

Lamarck divides the species into two sections: first, those which have the internal border of the valves entire or nearly so; second, those that have the internal border distinctly crenulated or dentated.

De Blainville separates them into five divisions, according to the shape, sculpture, and markings of the shell. His fifth division is the genus *Capsa* of Lamarck.



[Donax scortum.]

Fossil Donaces.

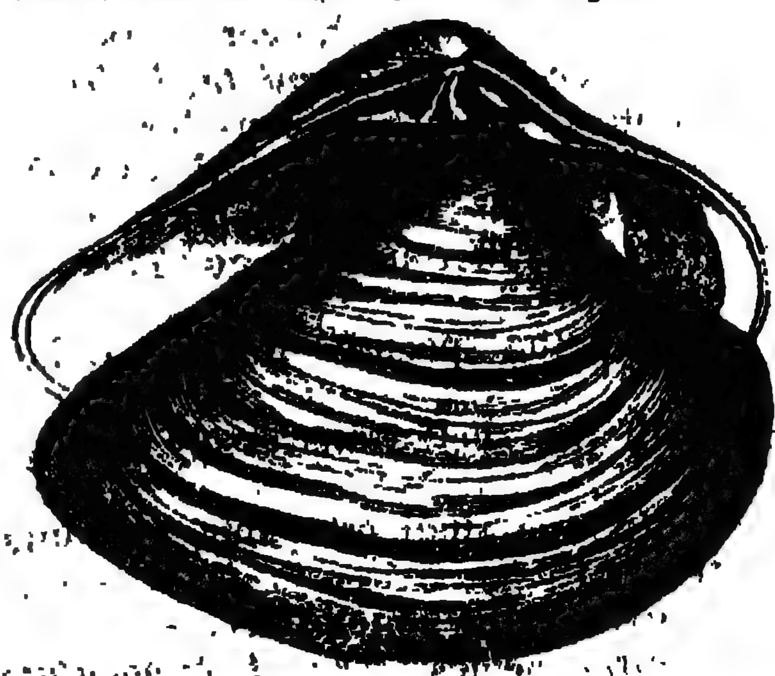
Mr. G. B. Sowerby in his *Genera of Shells* (No. 10, published some time since), says, 'Of fossil species there are very few: Brocchi mentions two, and we possess a small one from Bordeaux, but we believe they are very scarce.' De Blainville quotes Defrance for seventeen, three of which are analogues, one at Loignan, near Bordeaux, one in Italy, and a third in the environs of Paris. Deshayes in his tables gives fifteen fossil (tertiary), and one only (*D. elongata*), as both living and fossil (tertiary). In his edition of Lamarck, the last-mentioned species is passed without any notice of its occurring in a fossil state; but *D. trunculus* is noted as fossil, and Brocchi, Conch., t. ii., p. 537, No. 1, is quoted: nine fossil species only are given. The fossils are said to have occurred principally in the blue marls of the south of France*, &c., the beds at Bordeaux and Dax, and in the oolitic group.

Gratelupia (fossil only).

Shell subtrigonal, equivalve, regular, nearly equilateral, a little attenuated at its posterior part, and presenting at the postero-inferior border a slight sinuosity; umbones very small, not projecting, hardly inclined forwards; hinge with three cardinal diverging teeth in each valve, and from three to six cardini-serial teeth, lamellar with finely dentelated edges, converging towards the summits, and situated a little below them, under the ligament; a single lateral tooth, anterior, beneath the lunule, in the left valve, corresponding with a hollow similarly situated in the right valve; ligament external, long, swollen, passing beyond the serial teeth; muscular impressions nearly equal, oval, united by a pallial impression largely and very deeply excavated posteriorly.

This genus, founded by M. Charles des Moulins, was confounded with the *Donaces* by M. de Basterot. M. Rang, who agrees with M. des Moulins on the propriety of this separation, says that there is but one species, *G. donaciformis.*

Locality.—The marine beds of Mérignac (tertiary). Mr Lea, in his interesting 'Contributions to Geology†,' describes and figures another species, *G. Moulinsii*, from Claiborne, Alabama (America), here copied.



[Gratelupia Moulinsii.]

Tellina and Tellinidea.

Animal generally very much compressed, considerably elongated; mantle moderately open at its antero-inferior

* The term 'blue marls of the south of France,' &c., is here used in the same sense as it is by M. Marcel de Serres and in De La Beche's Manual.

† Philadelphia, 1833. Mr. Lea considers the strata of Claiborne as tertiary, and refers them to the same period as the London clay of England, and the Calcaire grossier of Paris,—Eocene period of Lyell.

part, and bordered with tentacular appendages; branchiæ unequal, on both sides; foot very much compressed, trenchant, and pointed before; tubes very much elongated, separated, and capable of being returned into a fold of the mantle.

Shell generally elongated, and very much compressed, equivalve, regular, sometimes slightly inequilateral; the anterior side not being always much longer than the posterior one, which is often angular, with a flexuous and irregular bend or fold at its lower border; umbones very small; hinge with three cardinal teeth, and two lateral ones which are often distant, with a hollow at their base in each valve; ligament posterior, swollen and elongated; a very small second ligament near the umbo; muscular impressions rounded; pallial impression straight, and very deeply excavated.

Lamarck makes the forms of *Tellina* and *Tellinides* distinctly generic. Mr. G. B. Sowerby follows Lamarck's arrangement, observing that of the *Tellinæ* there are many species, some of a form very much elongated in a transverse direction, as *T. rostrata*, *Spengleri*, &c.; others of an oval shape, some of which are rough on the outside, *T. Lingua-felis*, for example; others, again, nearly orbicular, *T. scobinata*, *T. carnaira*, &c.; a very few have one valve more flat than the other, *T. operculuris*, for instance: while both valves are remarkably deep in others, as in *T. lacunosa*. Of *Tellinides*, he says that the number of shells that may be ranged under it is rather considerable, although Lamarck has mentioned only one.

Both M. de Blainville and M. Rang think that these two forms belong to one genus, and M. Deshayes is of the same opinion. In his edition of Lamarck, he observes that the *Tellinæ* are allied by almost insensible gradations to the *Psammobiæ* (*Psammobia* and *Psammotea*, Lam. *Psammocola*, De Blainv.) on one side, and to the *Donaces* on the other, not only in the characters of the shells, but in that of the animals. Under *Psammobia*, however, it would appear that his observations on the animal are founded on the figure in Poli, for he says that in a species made known to him by MM. Quoy and Gaimard from the voyage of the Astrolabe, characters were observed which, up to that time, the *Tellinæ* had not offered. The lobes of the mantle of this animal were very thick, dentelated, and reaching beyond the shell, which thus became demi-internal. [PSAMMOBIA.]

Geographical Distribution and Habits.—Found in almost all seas, but more particularly in those of warm climates, where, like the *Donaces*, they live plunged in the sands and sandy mud; *Tellina* having been found in the former at depths varying from the surface of the sea to seventeen fathoms, and *Tellinides* in sandy mud at depths ranging from five to sixteen fathoms. Mr. G. B. Sowerby observes that they are commonly the prey of *Aporrhaides*, *Buccina*, and other carnivorous *Trachelipods*, which pierce the shell to devour the inhabitant.

The species are very numerous. M. Deshayes, in his tables, makes the number of living species sixty-eight, and that of *Tellinides*, one. In his edition of Lamarck (1835), he records sixty-two only, the number of species of Tellinides being still one. Of these, he considers some as repetitions or varieties (*Tellina* [illegible]*ulata*, *Tellina sulphurea*, for example, the first of which he considers a white variety of *T. radiata*, and the second as identical with *T. latirostra*, the only difference being that of colour), and others as founded merely on the difference of age (*T. chloroleuca*, for example).

Lamarck divided the species into the following divisions.

1. Those with the shell transversely oblong. (Ex. *T. radiata.*)

2. Those with the shell orbicular, or rounded oval. (Ex. *T. scobinata.*)

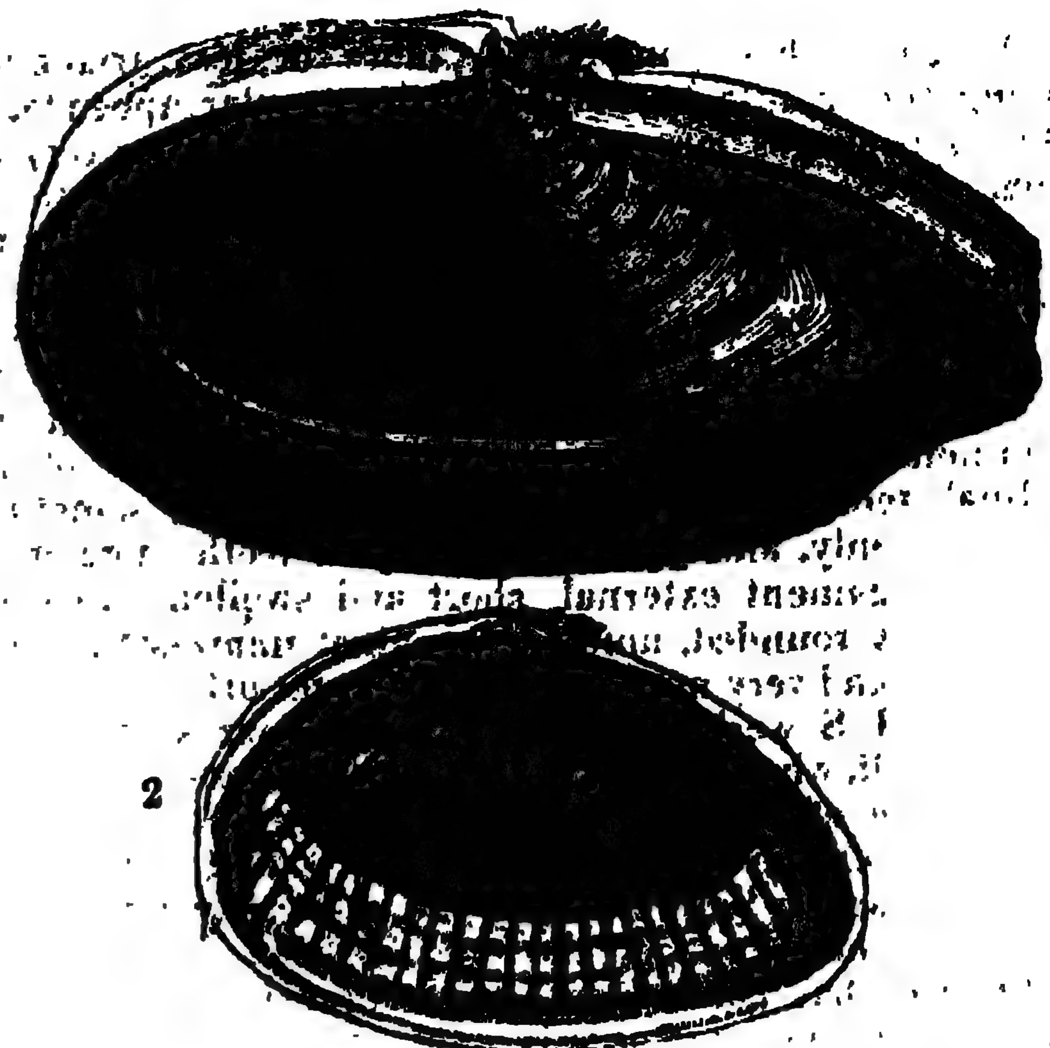
De Blainville divides the genus thus:—

1. Subtriquetral species. (Ex. *T. bimaculata.*)

2. Elongated species, but which have the posterior side shorter and narrower (plus étroit) than the anterior. (Ex. *T. radiata.*)

3. Oval, or suborbicular, and nearly equilateral. (Ex. *T. scobinata.*)

4. Equilateral species, sufficiently elongated, almost without a flexuous fold; two divergent cardinal teeth, and two distant lateral ones, of which the anterior is but little distant from the umbo. (*Tellinides*, Lam.)



[1. Tellina rostrata. 2. Tellinides.]

FOSSIL TELLINIDÆ.

Mr. G. B. Sowerby, in his '*Genera*,' says that the fossil species are not numerous, and only found in the newer tertiary beds. De Blainville gives the number (1825) at twenty-three, of which there are four analogous in the Plaisantin, according to Brocchi, and three identical at Grignon, according to M. Defrance. M. Deshayes, in his tables, makes the number of fossil (tertiary) species fifty-four, and he records twelve species as both living and fossil (tertiary). In his edition of Lamarck (who, at the end of the notice of his fourth and last fossil species, printed in both editions, refers to the seventh volume of the 'Annales du Museum,' for other fossil Tellens), he gives sixteen.

Among the fossil shells collected from the western borders of the Red Sea, by Mr. James Burton, communicated to Mr. Lyell by Mr. Greenough, then President of the Geological Society, are the following species not noticed in the tables: *Tellinæ Lingua-felis*, *rugosa*, *virgata*, *rostrata*.

The fossil species are recorded as occurring in the Supracretaceous group, in the Cretaceous group, and in the Oolitic group (Coralline Oolite, Yorksh.; Kimmeridge clay; Bernese Jura). Mr. Murchison mentions two species (probably) in the Salopian outlier of Lias.

Amphidesma.

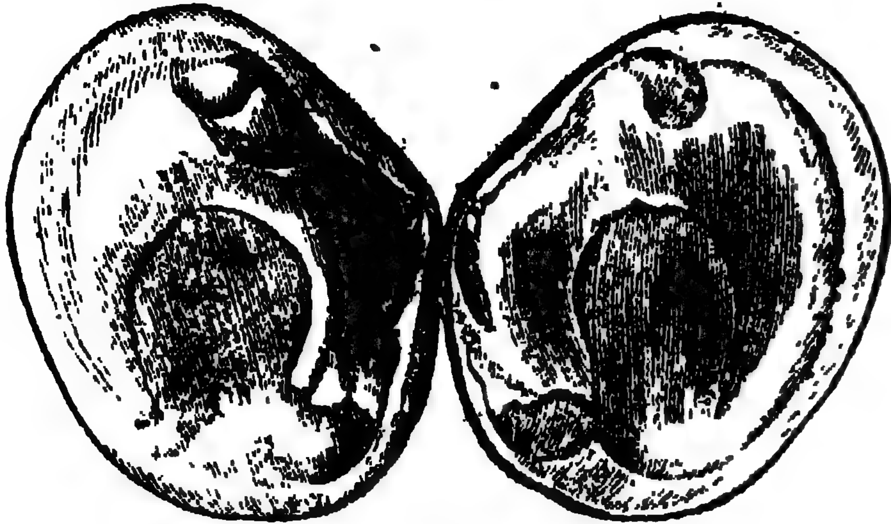
Lamarck, after having founded the genus *Donacilla*, thought it necessary to suppress it and unite it to *Amphidesma*. But, observes M. Deshayes in his edition, he did not perceive that many other shells which he placed among the *Mactræ* and *Crassatellæ*, had absolutely the same characters with Donacilla, and differed, generally, from the greater part of the *Amphidesmata*, *Mactræ* and *Crassatellæ*. In consequence of these observations, and from examinations both of shells and of the animal communicated to him by MM. Quoy and Gaimard, M. Deshayes formed his genus *Mesodesma*. We return to *Amphidesma*, reminding the reader that M. Deshayes remarks that it should be studied with attention, that it is 'peu naturel,' and ought not to be retained till it has undergone the necessary reforms. M. Rang, who observes that M. de Blainville had confounded the last named genus with *Lucina*, gives the following characters.

Shell suboval or rounded, of little thickness, longer than it is high, inequilateral, sometimes a little gaping; hinge with one or two cardinal teeth, and sometimes lateral teeth more or less projecting; ligament double, one ligament external and short, the other internal and [illegible] in a narrow (étroite) hollow of the hinge.

Geographical Distribution, Habits, &c.—As the genus was left by Lamarck, it would appear to be widely spread, for it is recorded as occurring in the European seas (Northern, English channel, Mediterranean); those of New Holland and the south; and on the coasts of Brazil. But it should be remembered that *Amphidesma corbuloides*, Lam., *Mya Norwegica*, Chemn., is the example given by Deshayes for his genus *Osteodesma*, while *A. glabrella* (seas of New Holland and Kanguroo isles) is one of his *Mesodesmata*. The

species, which are tolerably numerous in their undisturbed state (*Amphidesma*, Lam.), are said to have been found in sands and mud at depths varying from the surface of the sea to forty fathoms. Lamarck gives sixteen species; Mr. G. B. Sowerby has added twelve, brought home by Mr. Cuming. (*Zool. Proc.*)

Example, *Amphidesma variegatum*. Locality, coast of Brazil.



[Amphidesma variegatum.]

Fossil Amphidesmata.

Mr. G. B. Sowerby (*Genera*) says he does not recollect to have seen Amphidesma in a fossil state. Deshayes, in his tables, notes three living species and one fossil (tertiary), probably the new species without a name, recorded by Mr. Lyell, as having been found by the latter at Caltagirone. Five species are recorded by Phillips in the oolitic group. In Dr. Fitton's paper, one species from the green-sand is figured, and described as doubtful.

Mesodesma (Deshayes).

Animal inclining to oval or subtrigonal, flattened; lobes of the mantle united for two-thirds of the posterior length, and provided, at their posterior extremity, with two short siphons prolonged within by a very delicate membrane; foot very much flattened, quadrangular, hidden in part by the branchiæ, which are short, truncated, and fixed (soudées) posteriorly, the external pair smallest and subarticulated. Shell oval, transverse or triangular, thick and ordinarily closed. Hinge with a spoon-shaped hollow, straight and mesial for the ligament, and, on each side, an oblong and simple tooth. (Deshayes.)

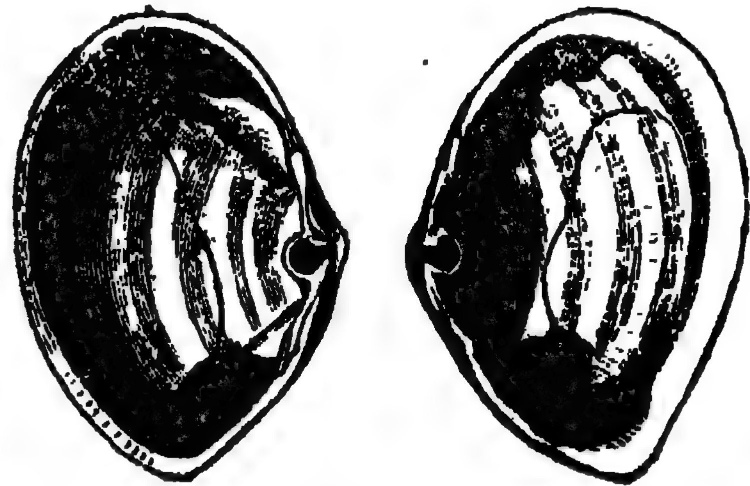
M. Deshayes remarks that the shells of this genus are easily recognized. The shell is always thicker than that of the *Mactræ:* they are more compressed, more completely closed (mieux fermées) and in this respect approach the *Crassatellæ*. The hinge is particularly remarkable; in the middle of the border and immediately below the umbo, is placed a spoon-shaped, triangular, deep hollow, the border of which projects within the valves as in the greater part of the *Lutrariæ*. On each side of this spoon-like process, in which the ligament is inserted, is seen in each valve a large thick tooth, and behind, a hollow to receive the tooth of the opposite valve. Muscular impressions unequal; the anterior largest, elongated; the posterior somewhat rounded. The Pallial impression in the species which approach the *Mactræ* has a moderate posterior sinuosity which diminishes more and more in proportion as the species have more resemblance to the *Crassatellæ*. The sinuosity exists, however, in all the species of the genus.

M. Deshayes concludes, from these and other observations, that the *Mesodesmata* constitute a distinct genus, differing more from the *Amphidesmata* than the *Mactræ* and *Crassatellæ;* and he purposes to place it in the method between these genera as intermediate, or being the point of junction, serving to confirm the relations established by Lamarck between the *Mactræ* and *Crassatellæ*, relations which, he observes, many zoologists have wished to destroy without sufficient reasons. M. Deshayes then gives a list of ten species which are either *Mactræ*, *Crassatellæ*, *Amphidesmata*, or *Erycinæ* of authors. In his tables only seven species, and those living, are recorded. The genus is there placed between *Mactra* and *Erycina*. No fossils mentioned.

Cumingia (G. B. Sowerby).

'A genus which should be placed near to Amphidesma. It is remarkable for the dissimilarity of the hinge of the two valves, one having a strong lateral tooth on each side of the ligament, and the other being entirely destitute of lateral teeth. Having only met with a small West Indian species, we could not venture to consider this genus as established, until Mr. Cuming showed us several species in his rich collection of South American and Pacific shells, one of which is sufficiently large to show the characters distinctly.' (Genera of Recent and Fossil Shells, No. 40.) Mr. Sowerby characterizes the shell as inequilateral, equivalve, with the anterior side rounded and the posterior rather acuminated. A single small anterior cardinal tooth observable in each valve: one strong lateral tooth on each side of the hinge in one valve, but no lateral tooth in the other valve; ligament internal, and affixed to a somewhat spoon-shaped pit in each valve. Muscular impressions two in each valve, lateral and distant, the anterior irregular and oblong, the posterior rounded. A very large sinus in the muscular impression of the mantle.

Geographical Distribution and Habits.—Tropical seas as far as is yet known, in clay, mud and sand, in the fissures of rocks, at a depth varying from the surface of the sea to six fathoms. No fossil species known. Example, *Cumingia mutica* (Sow.)



[Cumingia mutica.]

Mactra.

Animal oval, somewhat thick, with the borders of the mantle thick and simple, furnished posteriorly with two tubes but little elongated, and united; branchial laminæ small and nearly equal; foot oval, trenchant, very long, angular. Shell transverse, inequilateral, subtrigonal, sometimes a little gaping at the sides; umbones protuberant; hinge with one cardinal tooth, folded into the shape of the letter V, the point being nearest the umbo, and the branches diverging from it; posterior to this and very close to it is a very thin sharp tooth; sometimes the branches of the folding tooth are separated at the base, forming two diverging teeth; ligamental pit immediately behind the angular tooth and projecting within the shell. Lateral teeth, two on each side in one valve, one on each side in the other, diverging from the umbones, and very near the margin, thin, mostly elongated, and the inner ones more prominent than the outer, but in some species very short, in the thicker species perpendicularly striated. Muscular impressions two, lateral, distant; pallial impression with a small sinus. Ligament consisting of two portions (as usual), one, by far the larger, internal; the other external. In some species the umbones are separated, and the ligament forms a deep pit extending both within and without to the point of the beaks: of this *M. Spengleri* is an example. (G. B. Sowerby, principally, for the shell.)

'This genus,' says Mr. G. B. Sowerby, 'contains a great number of species, some of which are handsome and others very singular shells; upon examining a number of species, we think it might be desirable to divide it into several genera, because we find several distinct forms in it.' (Genera.)

Geographical Distribution.—Wide. Europe, East and West Indies, Africa, North America, &c.

Habits.—Buried generally in sandy mud and sands, at a depth varying from the surface of the sea to 12 fathoms.

The species are numerous; Deshayes, in his tables, gives 32 living: in his edition of Lamarck 33; but, in his opinion, one of these, *M. donacia*, is not a *Mactra* but a *Mesodesma*, and others are repetitions or varieties.

De Blainville thus divides the genus:—

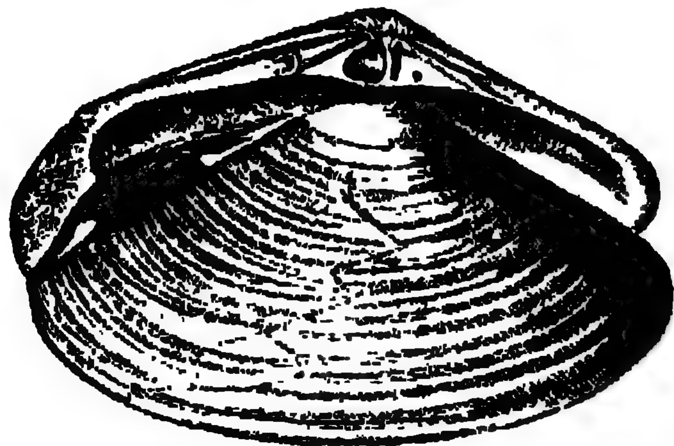
1. Species whose cardinal teeth become nearly non-existent in consequence of the enlargement of the ligamental hollow. (Ex. *M. gigantea*).

2. Species all of whose teeth are very large, lamellar, and not striated. (Ex. *M. stultorum*).

3. Thick and solid species without an epidermis; the lateral teeth finely striated; mantle pierced with two openings, but almost without tubes. (Ex. *M. trigonella*).

4. Very thick solid species striated longitudinally; cardinal teeth none or next to none; lateral teeth very

thick, approximated, raised; an external ligament besides the internal one. (Ex. *M. crassa*).



[Mactra Brasiliana.]

FOSSIL MACTRÆ.

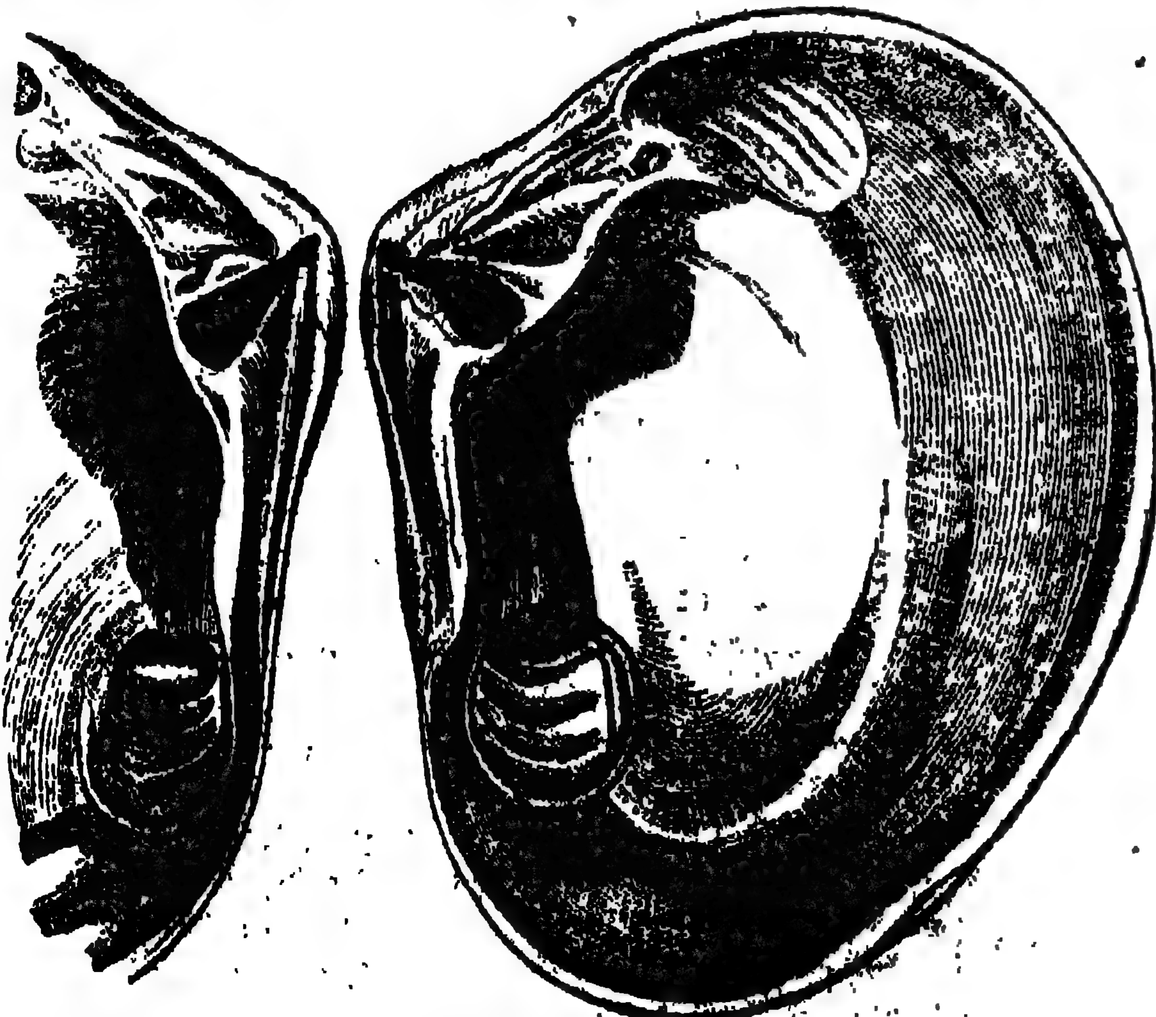
Mr. G. B. Sowerby says, 'The fossil species are not numerous; they are only found in the tertiary beds, unless, indeed, some very singular fossils found in the secondary strata, particularly oolite, be truly referable to this genus; of this, however, we cannot be certain, because we know not their hinges; they will be found represented in Sowerby's Mineral Conchology.' De Blainville quotes M. Defrance for 18 fossil species, one identical, one analogue in the Plaisantin, and another analogue 'dans la Caroline du Nord.' Deshayes, in his tables, gives 14 fossil (tertiary), and four as both living and fossil (tertiary): in his edition of Lamarck, but three species are given as fossil only. Among the fossil shells from the borders of the Red Sea, collected by Mr. J. Burton and communicated by Mr. Greenough to Mr. Lyell, we find *M. stultorum* with a (?) Mr. Lea gives three species, *M. dentata*, *Grayi*, and *pygmæa*, from the Claiborne beds.

Crassatella.

Shell equivalve, transverse, inequilateral, not attached nor gaping. In one valve two strong, cuneiform, rugose, sometimes perpendicularly-grooved cardinal teeth: in the other only one; ligament internal, attached to a concave space placed on the anterior side of the hinge; the pit divided by a carina into two portions, and that part of the ligament attached to the outer portion visible externally when the valves are closed: two strong oblong depressions may then be observed, one on the anterior side of the umbo, rather elongated, and not so distinct as the other on the posterior side. Muscular impressions two, distant, lateral, rather oblong; lateral teeth none, or nearly obsolete. Shell very thick, particularly in old specimens: the recent ones with a brownish somewhat horny epidermis; all more or less transversely grooved near the umbones.

Geographical Distribution.—Seas of New Holland.

M. Deshayes, in his tables, gives the number of living species at nine. In his edition of Lamarck, he makes them eleven, the fifth and the four last of which, he says, belong to his genus *Mesodesma*, and he observes that, by reducing the genus *Crassatella* to those species only which have two cardinal teeth, and, at their sides, the ligamental hollow large and superficial, it will be rendered much more natural than Lamarck left it. Thus the number of known living species would be reduced to seven or eight, and the others, which have the ligamental hollow, mesial and deep, and a cardinal tooth on each side, would, he says, be placed in his genus *Mesodesma*; but these numbers do not agree. The shells of the two genera, he adds, will be distinguished, moreover, by means of the pallial impression, which is always simple in the *Crassatellæ*, and always sinuous posteriorly in *Mesodesma*. Mr. G. B. Sowerby (*Zool. Proc.*) has described two new species brought home by Mr. Cuming.



[Crassatella Kingicola.]

FOSSIL CRASSATELLÆ.

Mr. G. B. Sowerby, in his '*Genera*,' mentions *C. tumida* and *C. compressa* from the calcaire grossier of the environs of Paris, and *C. sulcata* as very common at Hordwell, and as appearing to be characteristic of the London clay. M. Deshayes remarks upon that shell, that Lamarck regarded the fossils at Beauvais and those living at New Holland as analogues; but that he has satisfied himself that those fossils and *C. sulcata* are different species. *Crassatella tumida*, he observes, approaches *C. Kingicola* nearer than any other.

De Blainville states that there are seven, at least, fossil in France, and that M. Defrance mentions twenty from the lower chalk, with some doubt. In his tables, M. Deshayes gives 24 fossil species (tertiary): in his edition of Lamarck he records 14 only. It appears, in the catalogues, in the supracretaceous and cretaceous groups.

Of the other genera belonging to the *Conchacea*, *Venerupis*, *Petricola*, *Coralliophaga*, and *Clotho*, will be found under title LITHOPHAGIDÆ*, and the genera separated from *Venus*, or allied to that family, under VENERIDÆ.

CONCHIFERA. Lamarck's name for that large class of molluscous animals which are protected by shells consisting of two principal pieces; shells commonly known under the denomination of Bivalves. It comprises the whole of the acephalous mollusks of Cuvier, including the *Brachiopoda*.

Lamarck divided the class into two great orders, the *Dimyaria* (Dimyaires), or conchifers, furnished with two adductor muscles, and the *Monomyaria* (Monomyaires), or conchifers furnished with one adductor muscle only. M. Deshayes would separate the class into three subclasses. 1. The *Polymyaria*, or *Brachiopoda*. 2. The *Dimyaria*. 3. The *Monomyaria*. He founds this order of arrangement on the principle that the organization of the Brachiopoda is more simple than that of the other conchifers, while that of the *Dimyaria* is somewhat less complex than that of the *Monomyaria*.

ORGANIZATION.

Digestive System.—Mouth, without any hard parts, situated anteriorly: in the Dimyarians concealed between the foot and the anterior retractor muscle: in the Monomyarians under a sort of hood made by the mantle. Labial palps or lips flattened, sometimes truncated, sometimes laminated internally, more or less elongated, extending on either side. No salivary gland. *Œsophagus* varying in length and capacity; often wanting altogether both in Dimyarians and Monomyarians. *Stomach* sometimes, not often, lengthened and narrow, sometimes subcircular, generally pear-shaped; interior surface with irregular depressions, or biliary crypts. *Intestine* arising posteriorly, convoluted within the liver and ovary, and so brought towards the back and mesial line of the animal, and continued posteriorly to the vent, nearly of the same diameter all through. *Rectum*, which commences with the dorsal part of the intestine, shorter in the Monomyarians than in the Dimyarians: in the former it is convoluted behind the single central adductor, and terminates in a floating vent between the edges of the mantle; in the latter the vent is situated above the superior adductor. *Liver* very large, supported by muscular fibres, which traverse it, pouring the bile into the stomach by the biliary crypts.

Absorbent System.—Generally agreed to be non-existent, the veins performing the office of absorbing vessels.

Circulatory and Respiratory System.—Circulation, a simple circuit, of two vascular systems, viz., a ventricle and an arterial system,—a venous system and two auricles, the ventricle firmly and closely embracing the rectum, so that it *appears* to pass through it. The arterial system not complicated, the venous system upon a considerable scale of development. (Poli, *Testacea utriusque Siciliæ*.) *Circulating fluid* nearly colourless, or white, scarcely tinged with bluish, slightly viscid, and with very little *crassamentum*. [BLOOD, vol. v., p. 4.] 'Circulation then is an extremely simple function in the conchiferous mollusks: an aortic

* Perhaps, also, Ungulina; M. Rang having of late made observations confirmatory of its perforating habits.

ventricle gives the blood impulse enough to carry it through the two systems of vessels, to expel it from the heart, and to bring it back again to the auricle. In other branchiferous animals, the auricle is sometimes adapted to give the blood a new impulse when it is about to pass through the bran-chiæ; here, on the contrary, the auricles do not receive the blood until it has been exposed to the revivifying influence of the organs of respiration.' (Deshayes.) *Respiration.*—By means of branchiæ variously disposed, as will be noticed in the different families.

Generative System.—Simply an ovary enveloped in the visceral mass. Taking the common oyster for example, it rests, a whitish mass of considerable size, upon the adductor, and may be seen through the mantle. It occupies the whole upper part of the mollusk, and creeps down along the sides and lower parts, being filled at the time of reproduction with a milky fluid, containing multitudes of small granules of a whitish colour. These are the eggs; and, in many of the family, they are not, at the time of their exclusion, abandoned at once, but are deposited between the two membranes of the branchial laminæ, where they undergo a kind of incubation. In some the shell is developed in the ovum before it quits this receptacle. This fostering of the eggs seems to be analogous to the gestation of the eggs in the crustacea and the pipe-fishes. Sir Anthony Carlisle (*Hunterian Oration*, 1826) says, 'Oysters are viviparous, and their young are found within the tracheal passages, and between the folds of the coverlet (mantle) during the months of June and July in this climate. In its first state, the oyster exhibits two semiorbicular films of transparent shell, which are continually opening and closing at regular intervals. The whole brood are associated together, by being involved in a viscid slime, and in that state called the *spat*, it being common among viviparous animals of this kind to have their spawn posited in contact with the lungs; the involving slime serves as the first nutriment: and, we may infer, that the fœtal food so influenced by the gills, is at the same time a respiratory supply to the imperfectly formed young.' In the siphoniferous branch of the family, the longer the siphons the larger, as a general rule, is the mass of the ovary: in those forms which have the siphons short, and the foot comparatively large, the ovary is comparatively small. As far as anatomy has hitherto detected this part of the organization, here we have hermaphroditism in the true sense of the word. The whole business of reproduction is apparently carried on within the two valves of the shell without the aid of a second individual, as it is in a hermaphrodite flower. But it will occur to most observers that the conchifera are gregarious; the fixed conchifers (oysters, spondyli, chamæ, &c., for instance) eminently so; and it is by no means clear that this congregation may not be a necessary condition for the fecundation of the ova; and that there may not be a mutual diffusion of some influence analogous to that of the milt in fishes. M. Prevost, who made his experiments upon the *Uniones*, would make it appear that though there can be no coitus, still no propagation takes place without an assemblage of these animals upon the same spot.

Muscular System, as it regards motion.—Twofold; valvular and locomotive. The first consists in the adaptation of muscular fibre to the movement of the valves, and indeed this muscular apparatus may in some cases be made ancillary to locomotion, as in the Pectens, for example. These adductor muscles are attached to opposite points in each valve, and their office is to close the valves by their contractility, or suffer them to expand by their relaxation. In the greater number (Dimyaria) there are two: one anterior near the oval aperture, the other posterior. The Monomyaria have *apparently* one only; but Poli has shown that this muscle is in reality an approximation of two, and thence most probably arose the slight regard manifested by Cuvier for the division of Lamarck. The second or true locomotive organ is called the foot, and is formed of various layers of fibres, which, by their counteraction, bestow on it great power of motion, when the organ is well developed. Though in some species merely rudimentary, it is found in all the Dimyaria—not so in the Monomyaria, some of which are entirely without it. Its place may be defined by stating that the mouth is generally hidden between its base and the anterior adductor. Where well developed it is of various shapes, cylindrical, flattened, &c. In some it is a digging organ, or kind of ploughshare for making a furrow in the sand or mud wherein the animal means to lie hid; in others, as in the cockle, &c., it becomes a leaping organ, and enables the conchifer to clear a boat's gunwale when laid on the bottom boards. The foot is the instrument which produces the Byssus. Under that title De Blainville's theory will be found. Deshayes has since given a very different account of the structure:—'If the byssus and foot of a byssiferous mollusk be placed under a powerful lens, the last filaments of the byssus are first seen to be nearest to the base of the foot; and, if the inferior edge of the foot be inspected, a fissure will be found running completely along it, at the bottom of which a brownish and semicorneous filament is often to be perceived: this is neither more nor less than a filament of the byssus prepared to be detached by the animal, in order to which the animal stretches forth its foot until it encounters the object upon which the other fibres of the byssus are fixed; to this it applies the point of the foot, which then secretes a small quantity of glutinous matter, continuous with the silky filament lying along the bottom of the furrow of which we have spoken. When the pasty matter has acquired sufficient consistency, and is firmly fixed to the stone or other body at the bottom, the animal retracts its foot, and in doing so detaches the new fibre at the base of the pedicle. The mode in which the filaments of the byssus are formed is consequently entirely different from that in which hair or the horns of the higher animals are evolved, and it is easily understood when the intimate structure of the foot of the byssiferous mollusks is known, when we are aware that this organ consists in its centre of a pretty considerable fasciculus of parallel and longitudinal fibres. By a faculty peculiar to the class of animals that now engages our attention, the fibres situated at the bottom of the groove of the foot become horny, and are detached in succession in the form of threads as they become consolidated.'

The siphons are retracted by means of two lateral fan-shaped muscles, situated posteriorly.

Mantle and Cuticular System.—Two thin fleshy laminæ applied over the back of the animal, extending over its sides, and with its edges meeting along the anterior middle aspect of the body, covering, or closely in contact with, the whole interior surface of the shell, form the mantle, in the thickened edge of which is the principal apparatus that secretes the shell: there are also frequently rows of contractile tentacular cilia fringing it. The whole of these parts are exquisitely sensible, and highly contractile. The mantle becomes free at the origin of the branchiæ, and forms a cavity round the lower part of the animal, containing the visceral mass, the foot, for the extrusion of which there is an opening, and the branchiæ. This is the pallial sac, and is the area wherein the currents for respiration and nutrition are formed. The siphons, where they exist, project from the mantle, with which they are continuous. They are sometimes very long, and sometimes reduced to mere perforations; sometimes separate, and sometimes conjoined; but in any case the superior siphon is that destined for dejections, and is called the anal siphon, while the office of the lower one is to conduct the water to the branchiæ, whence it is termed the branchial siphon. The structure of these posterior siphons or tubes is eminently contractile, and their apertures [illegible] with a number of papillæ of great sensibility, [illegible] giving notice of the contact of any prejudicial [illegible]. The retractor muscle is generally more or less [illegible], according to the greater or less development of these parts.

Nervous System.—Very simple. Symmetrical in the *Dimyaria*, hardly symmetrical in the *Monomyaria*. No true brain. In the Dimyaria there is a ganglion above the œsophagus on each side of the mouth towards the labial palps, connected by [illegible] filament crossing the œsophagus. From these [illegible] filaments are given off to the mouth, anterior [illegible], &c.; and, from their posterior edges, two nervous [illegible] go to the stomach, liver and heart, ovary and [illegible]. A branch of some volume goes down to the foot. The [illegible] filaments, after advancing along the internal [illegible] of the [illegible], are conjoined into one or two [illegible] larger [illegible] anterior ones. These posterior ganglions give [illegible] nerves to all the posterior parts: if the ganglions are much separated, a nervous filament connects them. In the Monomyaria the system is less perfectly developed. The student must remember that though we owe to Poli the discovery of the nervous system of the conchifers, he mistook it for a system of absorbents and lymphatics, speaking of it as a system of lacteal vessels.

The *senses* of these animals must, reasoning from this

part of their organisation, be very confined; and indeed there is no good ground for attributing to the generality of them anything beyond a sense of touch and taste. That most of them may be conscious of the presence or absence of light is possible. 'Not having any especial organs for seeing, hearing, or smelling,' says Sir Anthony Carlisle, speaking of the common oyster in his Hunterian Oration (1826), 'the creature is limited to perceive no other impressions but those of immediate contact; and yet every part of its exterior seems to be sensible to light, sounds, odours, and liquid stimulants. It is asserted by fishermen, that oysters, in confined beds, may be seen, if the water is clear, to close their shells whenever the shadow of a boat passes over them.'

M. Deshayes goes so far as to say that no especial organ of sense can be detected among them, unless, perhaps, those of touch and taste; but we must not forget what have been called the eye-specks in the Pecten, to the animal of which Poli gave the name of Argus, from the supposed number of its visual organs. The pectens are free swimmers, and, from their rapid and desultory motions, we have heard them termed the butterflies of the ocean. The manner in which these motions are executed, especially on the approach of danger, indicates the possession of a sense analogous, at least, to that of ordinary vision. These eyespecks may be seen in the pecten placed at short intervals round the thickened edge of the mantle, on the outworks, as it were, of the internal part of the animal fabric. 'As locomotion so vision' is a general aphorism, not without its particular exception; for there is good reason for believing that *Spondylus*, which is a fixture in its adult state, is furnished with these visual specks.

Shell.—The lobes of the mantle, the thick edges of which form the principal secreting organ, determine, apparently, the form of the shell. The general structure of this substance will be given elsewhere. [SHELL, PEARL.] At present it will only be necessary to state that the shell of the *conchifera* is bivalve, or composed of two pieces, often covered with an epidermis, joined at their upper edge (corresponding to the dorsal part of the animal) by a *hinge*.

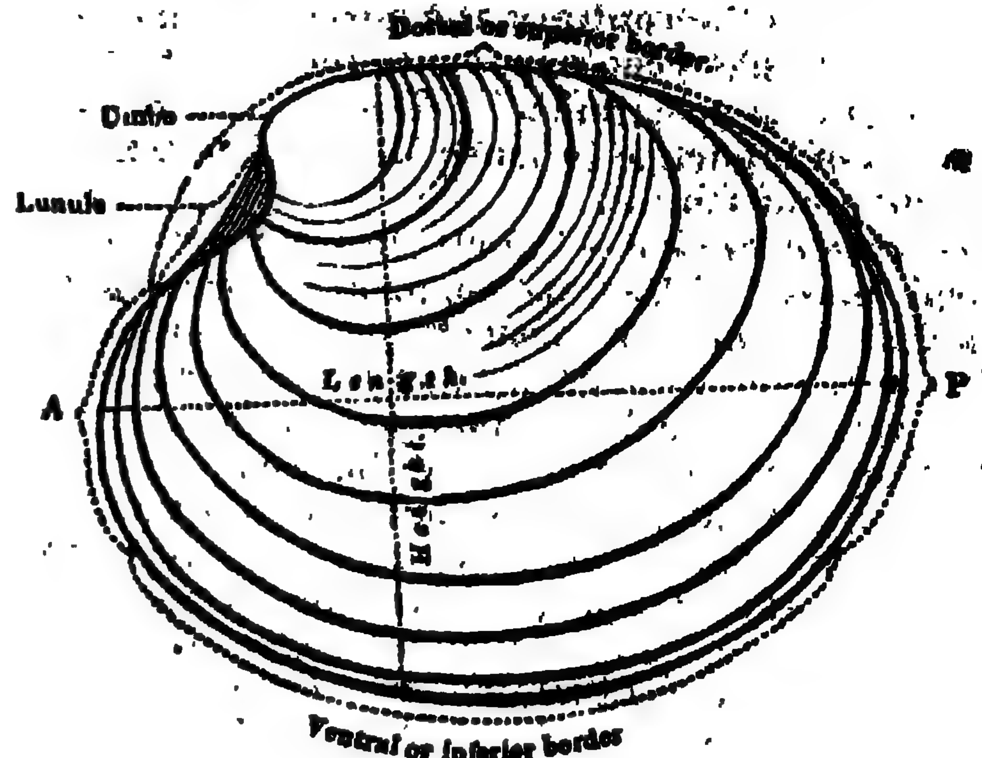
The hinge is entirely formed by the inner layer of shell, and consists of either a simple cardinal process, or a serrated edge, or of projections, or teeth as they are called, and corresponding cavities into which they are inserted. To this hinge is superadded a ligament, which binds the two parts together and keeps the parts composing the hinge in their places. The ligament is either internal or external, internal when it is hidden by the outside of the cardinal edge, external when it appears beyond it, and is highly elastic, being composed of a number of fibres parallel to each other and perpendicular to the valves which they connect. This is a beautiful contrivance for the necessities of the animal. When undisturbed, the elastic ligament keeps the valves open, and the animal functions are carried on without any effort; when danger is apprehended, or circumstances require it, the adductor muscle or muscles contract, overcome the resistance of the hinge, and shut the valves close till they may be opened in safety. One of the earliest signs of the loss of vitality in the conchifers is the more than ordinary wide gaping of the shell. This arises from the state of the adductor muscle, which being relaxed by death is no longer an antagonist to the elastic ligament.



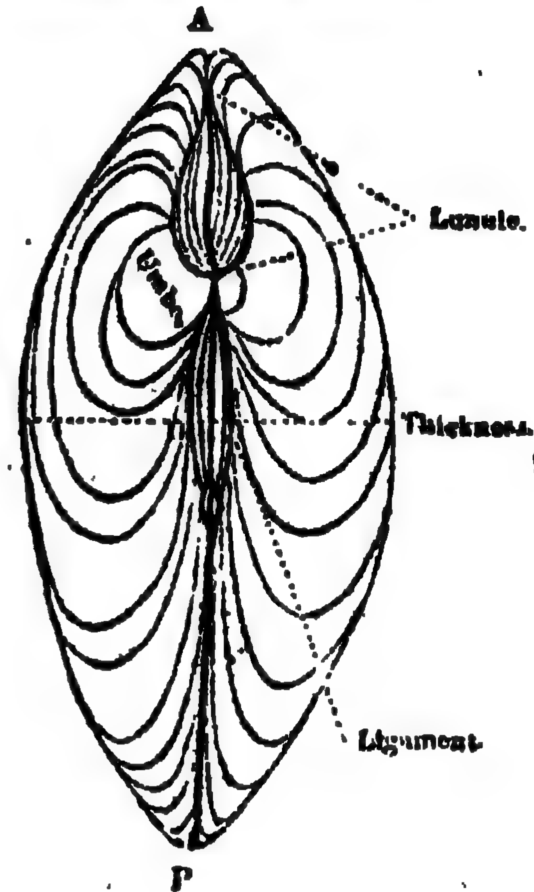
[Unio pictorum.]

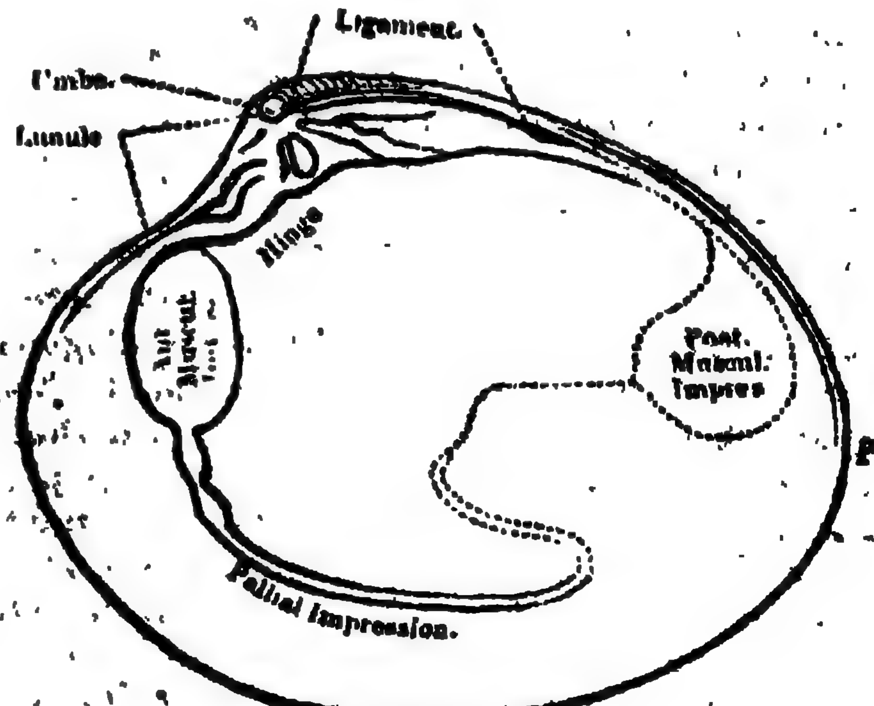
A. Anterior, or oral extremity. P. Posterior, or anal extremity, with the siphons or tubes. H. Hinge. F. Foot.

The common oyster will serve as an example of the Monomyarians, and the cuts will give a general idea of the Dimyarians, their shell, and its muscular impressions.



A. Anterior, or oral extremity.
P. Posterior, or anal extremity.





[Shell of Cytherea.]

The student should more especially consult the works of Poli, Cuvier, Lamarck, De Blainville, Rang, and Deshayes. The last-named author has lately proposed an amended arrangement, which will be found at the end of his article "Conchifera," in the Encyclopædia of Anatomy and Physiology.*

CONCHOID, (κογχοειδής, resembling a shell.) This name was given by Nicomedes (in the second century) to a curve, by which he proposed the finding of two mean proportionals, and the duplication of the cube. It is found in the commentary of Eutocius on the sphere and cylinder of Archimedes, and in the fourth book of Pappus.

This curve is described by a revolving line, which passes through a fixed point, and is always produced to meet a certain fixed line. On the revolving line, from the point in which it meets the fixed line, set off a given line both

* In the article 'Conchacea,' p. 427, under the cut in the first column, for 'Cardium [illegible],' read 'Cardium elongatum.'

ways. The two points thus laid down trace out the upper and lower conchoid, two different branches of the same curve. The lower conchoid has two points of contrary flexure, a cusp, or a loop, according as the given line is less than equal to, or greater than the perpendicular from the pivot of revolution to the fixed line. Taking the pivot of revolution as the origin, and the perpendicular just named as the axis of x, the equation of the conchoid is,

$$(x^2 + y^2(x - b)^2 = a^2 x^2,$$

where a is the given line, and b the distance of the pivot from the fixed line. [DUPLICATION OF THE CUBE: TRISECTION OF THE ANGLE.]

CONCHO'LEPAS. [ENTOMOSTOMATA.]

CONCHOLOGY, Conchyliologie of the French. The science which teaches the arrangement of the shells of the testaceous mollusks into classes, sub-classes, families, sub-families, genera, and species. Formerly the great bulk of conchologists, as they were by courtesy called, consisted of mere collectors, who looked upon these beautiful and in many instances richly-coloured forms, as mere luxuries for the eye, mere toys to decorate a cabinet, much after the fashion of old china. But of late years this science has assumed its proper rank, and is justly considered as holding a high place, whether considered zoologically or geologically. To the geologist it has become a power of the greatest value in indicating the difference of strata and their comparative ages; while Linnæus, Poli, Cuvier, Lamarck, and a host of other philosophers, both dead and living, have shown its high zoological importance. We could not pass the title altogether unnoticed, but we must dismiss it for the present. It is, in our opinion, necessary in the existing state of our knowledge, that the student should consider *shells* as what they really are, *skeletons of molluscous animals*, forming a principal ingredient in their organization with which they are intimately blended, and not mere insulated bodies, mere stones as we have heard them termed, unconnected with the soft parts of the animals. For these reasons the reader will find the general view of this subject under the title MALACOLOGY.

CONCINNOUS INTERVALS, in Music, are the various concords. [CONCORDS.]

CONCLAVE (a Latin word, which signifies a private room), is the name given to the assembly of cardinals when they meet for the purpose of electing a pope. [CARDINAL.] The day following the last of the funeral of the late pope, the cardinals, after hearing a solemn mass de Spiritu Sancto, proceed to one of the pontifical palaces, generally the Vatican, where rooms have been prepared for each of them, and where they remain shut up till the election has taken place. The keys of the palace are left in the care of a prelate, chosen previously by the cardinals, and who is styled governor of the conclave. Each cardinal has with him a secretary, called conclavista, and two domestics. They meet once a day in the chapel of the palace, where a scrutiny is made of their votes, which are written and placed in an urn: this is repeated every day till two-thirds at least of the votes are in favour of one candidate for the pontifical chair, who is then considered as duly elected. Each cardinal in giving his written vote accompanies it by his name, written in a separate sealed paper, which is not opened till the pope is elected, when the names of the voters are made known. When the election is strongly contested, and the cardinals grow weary of being shut up in conclave, negotiations in writing are carried on between the leaders, and a compromise is entered into by which two or more parties, not being able singly to carry the election of the irrespective candidates, join in favour of a third person, who is acceptable to them all, or at least not obnoxious to any of them. This often gives an unexpected turn to the election. During the conclave the ambassadors of Austria, France, and Spain have a right to put their veto each upon one particular cardinal, whose election would not be acceptable to their respective courts. The new pope being elected, and his assent being given, he proceeds to dress himself in his pontifical robes; after which he gives his blessing to the cardinals, who give him the osculum pacis (kiss of peace). After this the name of the new pontiff is proclaimed to the people from the great balcony of the palace, and the castle Sant' Angelo fires a salute, and all the bells of the city of Rome ring a merry peal for one hour. (Calindri, *Saggio Geografico Statistico dello Stato Pontificio*, 1832.)

Regulations for the conclave, and the mode of election, have been issued by several popes, beginning from Nicholas II., in the council of Lateran, A.D. 1059, down to Gregory XV., by his bull of 1621, and Urban VIII. in 1625. In times of war or civil disturbance the conclave has been held in other places besides Rome; that in which Pius VII. was elected was held at Venice. Accounts of particular conclaves have been given by numerous writers who have treated of the history of the popes. (Meuschen, *Cæremoniale Electionis et Coronationis Pontificum Romanorum*, Frankfort, 1732.)

CONCORD, in Music, two combined sounds which are universally agreeable to the ear. It is commonly held, that the more frequently the vibrations of two strings coincide, and—which amounts to the same thing—the lower the terms in which the proportions of vibrations are expressed, the more pleasing the concord: but the 4th, an interval much less agreeable than either the 3rd or 6th, is a formidable exception to those rules, proving their fallibility by the test of experience. Rousseau is of opinion—and we agree with him—that the pleasure afforded by concords is attributable to their source, namely, the perfect chord [CHORD], which is itself the product, or combination, of nature. This, and its inversions, furnish us with all the concords.

Concords are the 8th (or octave), 5th, 3rd, and 6th. Their ratios are, 2 : 1, 3 : 2, 5 : 4, 5 : 3. The two first are called *perfect*, because, as concords, not liable to any alteration by sharps or flats. The two last are called *imperfect*, because alterable.

The 4th has always proved a stumbling-block to writers on harmony, for the reason above alluded to; but as a component part of an inversion of the perfect chord, it has some claim to be admitted among the concords. A great and recognised authority, of the modern French school, says, that it is treated as a discord in relation to the bass, as a concord in relation to the middle and upper parts. M. Catel, however, has not in this instance proved as correct as usual, except in the chords of $\frac{6}{4}$ and $\frac{6}{3}$, the 4th, as an inner part, is, and can only be, treated as a discord.

CONCORDANCE, 'a book which shows in how many texts of Scripture any word occurs.' (Dr. Johnson). More particularly, it is a dictionary or index of all the important words in the Bible, alphabetically arranged for the purpose of finding passages and of comparing the various significations of words. To critical interpreters this class of books is justly considered of the greatest utility, as furnishing an instrument by which the determination of the meaning of obscure expressions may be greatly facilitated by reference to all the parallel passages. 'A good concordance,' says Dr. Geddes (Prospectus, p. 71), 'is undoubtedly the best means of understanding the Hebrew Scriptures.' While the Bible remained in manuscript, and was not divided into chapters and verses, indices of the words and phrases could neither be formed nor used; but as soon as those divisions began to be made, the great importance of concordances, or alphabetical indices, was at once perceived, and several learned men employed much time and labour in constructing them. The compiler of the first concordance in any language was Hugo de St. Caro, or Cardinal Hugo, who died in 1262. The earliest concordance of the Hebrew text is by Rabbi Mordecai Nathan, printed at Venice in 1523. Its Hebrew title is, 'The Light of the Way.' It contains all the Hebrew roots, branched into their various significations, and is said to be the produce of ten years of incessant labour. A more correct edition was published at Basil in 1581, and a Latin translation by Reuchlin in 1556; but both the Latin and the Hebrew editions are extremely inaccurate. The errors are, for the most part, corrected in the work by Calasius, which combines the labours of Nathan and Reuchlin. It is entitled 'Concordantiæ Sacr. Bibliorum Hebr. et Lat.,' 4 tom, fol. 1621. The additions by Calasius consist of very learned and laborious etymological remarks. The reprint of this ponderous work in London in 1747-8 contains among its subscribers all the crowned heads of Europe, including the Pope. The work by the elder Buxtorf, 'Concordantiæ Bibliorum Ebraicæ nova et artificiosa methodo dispositæ,' &c., fol. 1632, is more correct than Nathan's; but the references are made by Hebrew letters, and to the Rabbinical divisions of the Old Testament. An abridgment of it, by Ravius, is entitled, 'Fons Zionis, sive Concordantiæ Hebr. et Chald.,' 8vo. 1677. Dr. John Taylor, under the patronage of the English and Irish bishops, published, in 2 vols. fol. 1754, 'A Hebrew Concordance, after the manner of Buxtorf, adapted to the

English Bible. It is a complete and useful book for the English scholar. The 'Concordantiæ Particularum Ebræo-Chaldaicarum,' fol. 1675, and 4to. 1679, by Noldius, Theological Professor at Copenhagen, is very valuable for the explication of passages dependent on the Hebrew particles, a comparison of which is made with the Greek. The best edition is that of Jena, in 4to. 1734, with a Lexicon of Particles, by Michaelis, extremely useful to the Hebrew critic.

With respect to concordances of the Greek Septuagint, we may notice especially, Kircheri 'Concord. Vet. Test. Græcæ, Ebræis vocibus respondentes,' 2 tom. 4to. 1607; but the Hebrew being placed first, it is more useful for consulting the Hebrew than the Greek text. The most complete and accurate work of this description is Trommii 'Concord. Græcis Versionis dictæ LXX.' 2 tom. fol. 1718. 'I wish,' says Michaelis, 'this Concordance were in the hands of every theologian.' It contains Heb. et Chald. Indices; but the book of Daniel is omitted, the Septuagint version of it being at that time unknown.

The most important concordances of the Greek New Testament are, Betuleii 'Concord. Græcæ Nov. Test.,' fol. 1546. This is the first which appeared: it is now extremely scarce. 'Concord. Græco-Latinæ Nov. Test. ab Hen. Stephano Concinnatæ,' fol. 1594, 2nd ed. 1624, is a work unworthy of so distinguished a man, on account of its great inaccuracy. Schmidii 'Nov. Test. Græci ταμεῖον,' fol. 1638, revised ed. 1717 at Gotha, was beautifully reprinted in 2 vols. 8vo. at Glasgow, 1819. It is much more correct and valuable than that by Stephens. The 'Lexicon Anglo-Græco-Lat. Nov. Test.,' by Andrew Symson, fol. 1658, is a work of prodigious labour, but rendered almost useless by its bad arrangement. The 'Concordance to the Greek New Testament,' with the English to each word, by Dr. Williams, 4to. 1767, is sufficiently complete for ordinary purposes. The first concordance to the Latin Vulgate is that by Cardinal Hugo, entitled, 'Concord. Bibliorum et Canonum,' fol. 1479. After the revision of the Vulgate by Pope Sixtus V., a new and amended edition of Hugo's work appeared at Antwerp in 1617, and subsequently at Geneva in 1625, and at Paris in 1683. There have since been a great number of reprints. The best is that of Avignon, 2 vols. fol. 1786. In compiling the original MS. it is said that the cardinal engaged the services of 500 Dominican monks.

The first Concordance to the English New Testament was 'imprinted by Thomas Gybson' previous to the year 1540. The first to the entire Bible is by 'Jhon Marbeck,' London, in folio, 1550. Subsequent to these there have been several, the principal of which are, Knight's 'Concordance Axiomatical,' fol. 1610; Cotton's Concordance, fol. 1618; Newman's large and complete Concordance, fol. 1643; Bernard's 'Thesaurus Biblicus,' fol. 1644; Wilkins's Concordance, 4to. 1647; Powell's, 8vo. 1671; the 'Cambridge Concordance,' fol. 1689; Butterworth's, 8vo. 1767. But by far the most complete and valuable is the one by Alexander Cruden, the merits of which are too well known to require any remark. The first edition was in 4to. 1737; but the most correct is that of 1810. An 8vo. edition, beautifully printed, appeared in 1824. We must notice finally the 'Concordance of Parallels,' by the Rev. C. Crutwell, 4to. 1790. It is a work of great value, compiled with immense labour from a multitude of Bibles and Commentaries in the Hebrew, Latin, French, Spanish, and other languages. For further details respecting the Concordances here mentioned, and several others, see Watt's *Bibliotheca Britannica* and Orme's *Bibliotheca Biblica*.

CONCORDAT is the name given to a formal agreement between the see of Rome and any foreign government, by which the ecclesiastical discipline of the Catholic clergy and the management of the churches and benefices within the territory of that government are regulated. It is, in fact, a diplomatic negotiation and treaty concerning ecclesiastical affairs, including also temporalities belonging to the church. The frequent disputes between the popes and the various states of Europe touching the right of appointing to vacant sees and benefices [BENEFICES], and also about the claims of the see of Rome to part, or in some cases the whole of the revenues of vacant sees and livings, and of the first fruits and tenths of those which it had filled, as well as the immunities claimed in various times and countries by the clergy and supported by Rome, such as exemption from taxation, and from the jurisdiction of the secular courts, the right of asylum for criminals in the churches, and other similar claims, the particulars of which are found in the history of every country of Europe;—all these have given occasion to concordats between the popes and particular states, in order to define the rights of each party, to draw a line between the secular and ecclesiastical jurisdictions, and thus put an end to controversy and scandal. By the concordat of 1516 between Leo X. and Francis I., the king abolished the right exercised by the chapters of electing the respective bishops, a right assured to them by St. Louis and by the states of the kingdom under Charles VII. in 1438. The parliament refused for two years to register this concordat, as contrary to the spirit of the general councils and the liberties of the Gallican church; it registered it at last March 19, 1518, 'by express and repeated commands of the king.' (Grégoire, *Essai Historique sur les Libertés de l'Eglise Gallicane.*) Concordats have become most frequent since the middle of the eighteenth century, an epoch from which the European governments have made themselves more independent of the ecclesiastical power, and the popes have been for the most part men of an enlightened and conciliatory spirit. Benedict XIV., by a concordat with the king of Sardinia, in 1741, gave up to the latter the right of nomination to benefices in various provinces of the Sardinian monarchy, which the see of Rome had claimed till then, as well as the temporalities of the same during a vacancy. A concordat was made between the pope and Charles, king of Naples, about the same time, by which the property of the clergy became subject to taxation, and the episcopal jurisdiction in temporal matters was greatly limited. By another concordat between Clement XIV. and the king of Sardinia, the right of asylum to criminals in the churches was much restricted, and full power was given to the respective bishops to expel and give up to the secular power those guilty of heinous offences. But the most celebrated concordat is that agreed upon between Cardinal Consalvi, in the name of Pius VII., and the first consul Bonaparte, in July, 1801. By it the head of the state had the nomination to the vacant sees, but the pope was to confer canonical institution, and the bishops had the appointment to the parishes and their respective dioceses, subject however to the approbation of the government. The clergy became subject, in temporal matters, to the civil power, just like laymen. All immunities, ecclesiastical courts, and jurisdictions, were abolished, and even the regulations of the public worship and religious ceremonies, and the pastoral addresses of the clergy, were placed under the control of the secular authorities. Most of these provisions remain in force in France to the present day. Regulations nearly similar exist in Austria and other German states. Other concordats have been made with some of the Italian states. By that of 1818 with Naples, the king proposes the bishops, subject to the pope's scrutiny, and the pope consecrates them; the bishops have the right of censorship over the press, and the ecclesiastical courts are re-established for matters of discipline and for ecclesiastical causes as defined by the council of Trent. Appeals to Rome are allowed. It appears from the above facts, that the ecclesiastical authority and influence in Roman Catholic countries vary considerably according to the concordats, if there be any, entered into with Rome, or according to the civil regulations adopted and enforced by the respective governments towards the clergy as towards laymen.

CONCRETE, *concrētum*, in philology and metaphysics, is an epithet applied to the conception or expression of a quality which refers to or implies some particular subject in which the quality exists. It is used to denote a term having a naturally implied union with a subject; in other words, it signifies a quality accompanied with its particular subject, without any mental separation or abstraction, as learned, long, wise, round. It is therefore directly opposed to *abstract*, which denotes a quality conceived generally and separately, without reference to any object to which it belongs, as learning, length, wisdom, roundness. Thus the names of classes are abstract, and the names of individuals concrete; and from concrete adjectives are made abstract substantives. (Dr. Watts's *Logic*; Dr. Johnson's *English Gramm.*) Concrete numbers are subject to the same explanation, being such as indicate or directly imply a subject; as two men, five shillings, in contradistinction to abstract numbers, which denote a concep-

tion simply of the aggregate of two or five units. Concrete terms, in the scholastic phraseology, are called *paronyma*. The following remark is from Locke's Essay (b. 3, c. 8, sec. i.)—"This distinction of names shows us the difference of our ideas; for if we observe them, we shall find that our simple ideas have all abstract as well as concrete names, the one a substantive, the other an adjective, as whiteness, white, sweetness, sweet."

CONCUBINAGE is the cohabitation of a man with a woman, to whom he is not united by marriage. Among the Romans, concubinage was in use before the time of the Emperor Augustus, yet without being formally permitted by law. Augustus, with the view of preventing celibacy and encouraging marriage, A.D. 10, caused the famous law called Lex Julia and Papia Poppæa to be passed, which may be considered as much an ordinance of moral police as a measure in favour of population. This law contained several conditions advantageous for those who had the greatest number of children. By the same law, concubinage was legally allowed to unmarried men, with the restriction that not more than one concubine could be taken, and she must be a woman with whom marriage was not permitted, as women of mean descent, freedwomen, &c. The concubine did not enjoy the same rights as a wife, and the children begotten in concubinage were not considered as legitimate, but were called natural (naturales), a distinction which was of importance as to the right of succession.

Concubinage being inconsistent with the principles of Christianity, the Emperor Constantine the Great enacted laws against the institution, and it is now in all countries considered unlawful. Yet in Germany, among the reigning families, a left-handed marriage (Trauung an die linke hand or morganatische ehe) still sometimes occurs. This kind of marriage resembles the Roman concubinage, as well in its conditions as its consequences.

CONCUSSION of the BRAIN, SPINE, &c. [HEAD, INJURIES OF THE.]

CONDAMINE. [LA CONDAMINE.]

CONDE', a town in France in the department of Nord, at the junction of the little river Haine with the Scheldt or Escaut, 124 miles in a direct line N.N.E. of Paris, or 132 miles by the road through Senlis, Peronne, Cambray, and Valenciennes: in 50° 28′ N. lat., and 3° 35′ E. long.

Condé, after passing through other hands, came, about the close of the fifteenth century, into the possession of one of the branches of the house of Bourbon, which took from it the title of Prince of Condé. It was taken from the French by Charles V.: it was besieged and taken three times by the French, the last time, in 1676, by Louis XIV., to whom it was ceded at the peace of Nimeguen, A.D. 1678. In 1793 it was taken by the Austrians, and a few weeks after retaken by the French. It is now a place of war of the first class, and one of the bulwarks of the northern frontier. During the French revolution it bore the name of Nord Libre. The streets are irregular: there are only two or three *places* or open spaces, and those small.

The population in 1832 amounted to 3498 for the town, or 5350 for the whole commune. There are some coal-pits in the neighbourhood, and the situation of the place on the Escaut enables the townsmen to carry on considerable trade.

CONDE'-SUR-NOIREAU, a town in the department of Calvados in France, on the little river Noireau, a feeder of the Orne, and on a cross road leading from Mayenne by Domfront to Caen. It is 128 miles west of Paris in a straight line; in 48° 51′ N. lat., and 0° 34′ W. long.

Of the town itself, situated in a valley, the soil of which is far from productive, our authorities give no description: it had, according to Expilly, two parish churches and an hospital in the middle of the last century. The population in 1832 was 4904 for the town, or 5562 for the whole commune. They are engaged in the manufacture of linsey-woolsey, drugget, and cotton goods. Nails also of various sizes and qualities are made, especially for the ship-builders of St. Malo and Granville.

CONDE', LOUIS II. DE BOURBON, PRINCE DE, born at Paris in 1621, was the son of Henri II. de Bourbon, and grandson of Henri I. of the same name, who, with his cousin Henri of Navarre (afterwards Henri IV.), figured in the civil and religious wars of France, under the reigns of Charles IX. and Henri III. [HENRI IV.] The house of Condé was a branch of the house of Bourbon. The town of Condé, in Hainaut, from which it took its title, came to the house of Bourbon in 1487 by the marriage of Francis of Bourbon, Count of Vendôme, with Mary of Luxembourg, heiress of St. Paul, Soissons, Enguien and Condé. Charles de Bourbon, the son of Francis, had many children; the eldest, Antoine, became king of Navarre by marrying Jeanne d'Albret, by whom he had Henri IV. Louis de Bourbon, another son of Charles, and the first who assumed the title of prince of Condé, was killed at the battle of Jarnac, 1569. [CONDÉ (?)]. He had married Eléonore de Roye, Dame de Conty or Conti, by whom he had Henri I. of Bourbon, prince of Condé above mentioned, and François, who took the title of prince of Conti.

Louis II., prince of Condé, the subject of the present article, has been styled the Great on account of his military abilities and great success. At the age of 22 he won the battle of Rocroi in Flanders, 1643, against a superior Spanish force. He afterwards fought against the troops of the emperor, and gained the battles of Fribourg and Nordlingen. In 1647 he was sent into Catalonia. In the following year he returned into Flanders and defeated the imperial army commanded by the Archduke Leopold, brother to the Emperor Ferdinand III., at Lens in the Artois. Meantime the civil war of the Fronde broke out at Paris; Condé was courted by both parties, and he served both in succession. He was the means of bringing back young Louis XIV., the queen mother, and Cardinal Mazarin, into Paris in August, 1649. Condé, however, put a high value on his services: he was haughty and warm-tempered, and the cardinal was jealous and suspicious. The result was, that after several vile court intrigues, and plots and counterplots, Condé was arrested by order of the queen and the cardinal, and kept in prison for about one year, when the Parliament of Paris at last obtained his deliverance. Being appointed governor of Guienne, he treated with Spain, and soon after raised the standard of revolt, ostensibly against the cardinal, who continued to exercise the whole political power of the state in spite of the general dissatisfaction. Condé marched upon Paris; engaged Turenne in the faubourg St. Antoine, and entered Paris, where he had the parliament in his favour. The cardinal having at last consented to quit the court, the king published an amnesty, and re-entered Paris, 1652; but the prince of Condé retired to Flanders, where he served for several years in the Spanish armies. He fought, in 1654, at Arras against Turenne, who obliged him to retire, but the retreat was effected with great skill. In 1656 Condé, with Don Juan of Austria, defeated the Marshal de la Ferté, and obliged Turenne to retire from before Valenciennes. In 1658 Condé was defeated by Turenne near Dunkerque, which town was taken by Louis XIV., and given up to the English, according to an agreement with Cromwell. By the peace of the Bidasoa, 1659, Condé was reinstated in all his honours with a full amnesty. In 1668 he served under Louis XIV. in the conquest of Franche Comté. In 1672 Louis, having declared war against Holland, Condé commanded one of the corps d'armée which invaded that country; he took Wesel, and was wounded at the passage of the Rhine. In 1674 he gained the bloody battle of Senef, in Flanders, against the prince of Orange (William III. of England), and relieved Oudenarde. In 1675, after Turenne was killed near Satzbach, Condé took the command of his army, and obliged Marshal Montecuccoli, who commanded the imperial troops, to retire. This was Condé's last campaign. Being tormented by the gout, he left the service and retired to his estate of Chantilly, where he spent his latter years in the society of men of letters. Racine, Boileau, Bossuet, and Bourdaloue were often his guests. He died at Fontainebleau in 1586. His personal character has been variously represented. Bossuet is too panegyrical. The memoirs of Count Jean de Coligny, who knew him intimately, and which were published in 1799, are too unfavourable, and probably exaggerated. (*Œuvres de Lemontey*, tome 5.) Like most of the men high in office at the court of Louis XIV., their master included, Condé seems to have had but imperfect notions of moral principle. Desormeaux has written the 'Life of Condé,' 4 vols. 12mo. The narrative of his campaigns is interesting in a military point of view.

The line of Condé became extinct in 1830 by the death of the duke of Bourbon, son of the last prince of Condé, who, in the wars of the revolution, commanded a corps of French emigrants on the Rhine. The duke of Bourbon never assumed the title of prince of Condé. His only son,

the young duke d'Enguien, was put to death by Bonaparte in 1804. The Duke de Bourbon himself died at Chantilly soon after the revolution of July, 1830, in a mysterious manner, which was much commented upon in the newspapers of the time.

CONDENSATION. [EXPANSION.]

CONDILLAC (ETIENNE BONNOT DE), was born at Grenoble in the year 1715, and was distinguished at an early age for his taste for metaphysical inquiries. The works of Locke chiefly attracted his attention; and were the cause of his publishing, in the year 1746, his 'Essai sur l'origine des connoissances humaines,' a work intended to promulgate principles founded on those of the English philosopher. The tendency which Locke's works had naturally produced of tracing all knowledge back to sensations, induced him to publish, in 1749, his second work, the 'Traité des Systèmes,' which was designed to oppose the theories of Leibnitz, Spinosa, and others, as based upon abstract principles, rather than what he conceived the more solid foundation of experience. His third work, 'Traité des Sensations,' is his master-piece. The author supposes a statue, which he has the power of endowing with one sense at a time. He first gives it *smell* alone, and then traces what may be the pleasures, pains, abstract ideas, desires, &c. of a being so limited with regard to its faculties; the other senses are then added, and the statue gradually becomes a complete human being. His works seem to have made but little impression on the mass in his time, but he was much sought after by those of high attainments. Diderot, J. J. Rousseau, and Duclos were among the number of his most intimate friends, and his celebrity spread so far, that he was appointed preceptor to the Prince of Parma. In this capacity he published his 'Cours d'études,' divided into 'L'Art d'écrire, l'art de raisonner, l'art de penser, and Histoire générale des hommes et des empires,' a series of works calculated to promote his own philosophical views. Having completed the education of his pupil, he retired to philosophical meditations. In the year 1768 he was admitted a member of the academy in the room of Abbé l'Olivet, though, strange to relate, he never afterwards attended the meetings of this learned body. His labours only terminated with his life, as he published his 'Logique' but a few months previous to his death, which happened in the year 1780. His 'Langue des Calculs,' a posthumous work, did not appear till the year 1798.

As a philosopher, Condillac rather deserves the term *ingenious* than profound. He has the art of developing his own views in the most entertaining manner possible; and in working out his theories he almost becomes prolix. Not satisfied with giving his statue smell alone, examining its situation in that state, and then adding the other senses, he considers it endowed with each of the other senses alone, and thus extends his 'Traité des Sensations,' which is at best but a pleasing example, to a thick volume.

Professor Stewart has justly censured the French for taking for granted that Condillac was a correct interpreter of Locke, and at the same time is somewhat severe on their Locke mania. He observes that this nation rarely takes up a system till every other nation has done with it; that it began to take Descartes in the place of Aristotle, when Newton had overthrown Descartes everywhere else; and looked upon Locke (as interpreted to them) as infallible, when England had already modified his doctrines. It is clear enough that Condillac was not a faithful interpreter of Locke. He had, perhaps wilfully, overlooked a very short chapter in the 'Essay on the Human Understanding' —'Of simple Ideas of Reflection.' Locke traced all our knowledge to sensation *and reflection*; Condillac stopped at sensation alone, and thus produced a system which cannot be surpassed in sensualism. When his statue has smell alone, he tells us, that if a rose be presented to it, it is certainly, with respect to us, a statue smelling a rose; but is, with respect to itself, nothing but the smell of the flower; the very perceiving subject is to itself nothing but an odour. And this was supposed to be a faithful exposition of the doctrines of Locke—of Locke, who allows the mind ideas of reflection, 'when it turns its view inward upon itself, and observes its own actions about those ideas it has;' and therefore can never have conceived that a perceiving being cannot divide itself in thought from the thing perceived. Some have thought that Condillac imbibed this notion, of a sensation being in the mind only a modification of itself, from Berkeley: but though Berkeley denied an inanimate substratum to our sensations, he certainly never went so far as to make the mind take itself for a self-perceiving sensation.

Condillac's opinion of the importance of words is much more akin to Berkeley's views; without them he contends we should have had no abstract ideas (in the Locke language); that we can only think of a particular image, and our thinking of any general idea, as *man*, is an absurdity; that having observed something in common to several individuals, as *Peter*, *John*, &c., we agree to call them all by the term *man*, and that the general idea is nothing but an idea of such term, or an acknowledgment that the term may fit each of the individuals equally well. Something very like this may be found in Berkeley's Introduction to his 'Treatise concerning the principles of Human Knowledge.'

The knowledge of our own and of other bodies, according to Condillac, commences with the sensation of touch. He gives his statue that sensation, and making it strike itself with its hand, states that while this hand as it were, says, on the consciousness of a sensation, '*C'est moi*' (It is I), the part touched echoes the declaration: thus the statue concludes that both parts belong to its individual self, in other words, that it has a corporeal body. On the other hand, if the statute touch an extraneous body, though the hand says '*C'est moi*,' it perceives there is no echoing sensation, and therefore concludes there is another body besides its own.

Condillac is much lauded by M. La Harpe for his ingenious views of the progress of language. He begins with the language of action, and in the absence of abstract ideas among some American tribes, who have scarcely any language but that of cries and gestures, he finds a support for his hypothesis that these ideas depend on words. The language of action, he says, preceded that of words, and this latter language still preserved much of the character of its predecessor. Thus the elevation and depression of the voice succeeded the various movements of the body. Variation of accent was so much the more necessary as the rude people, who were beginning to lay aside their language of gesture, found it easier to express their meaning by changing emphasis than inventing words. This emphatic style of speaking is in itself a sort of prosody, which insensibly leads to music, and the accompanying of these sounds by gestures leads to dancing, all of which the Greeks called by the common name μουσική, music. He then proceeds to trace the drama, rhetoric, and even the peculiarity of the Greek language by regular steps, the language of action having formed the basis of all.

On the whole, the philosophy of Condillac is a system of ultra-sensualism; by omitting reflection (in Locke's sense of the term*), he makes the mind perceive nothing but sensations, itself being to itself nothing but a combination of sensations, and thus turn which way we will, there is no escape from the world of sense.

The fullest account of Condillac's philosophy for those who do not wish to peruse his voluminous works, will be found in La Harpe's 'Cours de la Littérature;' a short account of the influence of Locke on France through his medium is given in Professor Stewart's 'Philosophical Essays;' but those who wish to hear Condillac himself without much trouble, will find his system most fully and pleasantly developed in the 'Traité des Sensations.'

CONDIMENTS. [AROMATICS.]

CONDITION. Two possible events, A and B, may be so related, that (1) when A becomes event or effect, B also shall become event or effect: (2) or so that B being already event or effect, when A becomes event or effect, B may either cease to be event or effect, or may be diminished as to event or effect, or enlarged as to event or effect. This kind of relationship may be expressed by the term, condition, and the words by which this condition is made, may be any that are free from ambiguity. In case (1) where A must happen before B can, this may be called a condition precedent. In case (2) where B, already being event or effect, is extinguished or modified by the subsequent event A, this may be called a condition subsequent. The events may be more than two, and the condition which expresses their relation may be more or less complicated, but the general nature of the relation will still subsist. The application of this principle to legal questions is simply this:—Conditions precedent are conditions annexed to any gift of

* We insert this parenthesis, because the word 'reflection' may be found in the works of Condillac, but signifying nothing more than the looking back on past impressions.

an estate or interest which at law must be strictly performed, before such estate or interest can vest in the person designated by the gift. Conditions subsequent are when the estate or interest is already vested, but its continuance in the person in whom it is vested, depends on the breach or performance of the conditions.

Cases may arise, and in construction of agreements and particularly of wills often do arise, in which it is not easy to say whether the condition is precedent or subsequent; but in general, the difficulty arises rather from certain technical rules of law applicable to the construction of instruments, than from the bare terms in which conditions are expressed.

Littleton's description of an estate upon condition is this: (325) 'Estates which men have in lands or tenements upon condition, are of two sorts, viz., either they have estate upon condition in deed, or upon condition in law, &c. Upon condition in deed is, as if a man by deed indented, enfeoffes another in fee simple, reserving to him and his heires yearely a certaine rent payable at one feast, or divers feasts per annum, on condition that if the rent be behind, &c., that it shall be lawful for the feoffor and his heires into the same lands or tenements to enter, &c. And if it happen the rent to be behind by a week after any day of payment of it, or by a moneth after any day of payment of it, or by half a yeare, &c., that then it shall be lawful to the feoffor and his heires to enter, &c. In these cases, if the rent be not paid at such time, or before such time limited and specified within the condition comprised in the indenture, then may the feoffor and his heires enter into such lands and tenements, and them in his former estate to have and hold, and the feoffee quite to ouste thereof. And it is called an estate upon condition, because that the estate of the feoffee is defeasible if the condition be not performed,' &c.

An estate thus given is liable to be defeated, that is, the gift upon non-performance of the condition may be resumed by the giver, or his heirs: this is a condition subsequent, that is, subsequent to the vesting of the estate in the feoffee or grantee

The following example from Littleton will show the difficulty which has been introduced into the construction of conditions by the peculiar character of the laws of England (Litt. 350): 'If land be granted to a man for term of five yeares, upon condition, that if he pay to the grantor within the two first yeares, forty markes, that then he shall have fee, or otherwise but for term of the five yeares, and livery of seisin is made to him by force of the grant, now he hath a fee-simple conditionall, &c. And if in this case the grantee do not pay to the grantor the fortie markes within the first two yeares, then immediately after the first two yeares past, the fee and the freehold is and shall be adjudged in the grantor, because that the grantor cannot after the said two yeares presently enter upon the grauntee, for that the grauntee hath yet title by three yeares to have and occupie the land by force of the same grant. And so because that the condition of the part of the grantee is broken, and the grantor cannot enter, the law will put the fee and the freehold in the grantor.'

On this Coke remarks, that many are of a different opinion from Littleton, because the fee-simple is to commence upon a condition precedent (of which class the condition in the case put by Littleton clearly is), and yet 'here Littleton, of a condition precedent doth (before the performance thereof) make it subsequent.' And yet Littleton is right, for the legal effect of the livery of seisin is to pass a present estate of freehold.

It is a rule of law that none but the grantor and his heirs can have the benefit of a condition; and that any conditions are good which are not unlawful, impossible, immoral, or absolutely inconsistent with the nature of the estate given. An instance of the last kind of condition (Littleton, 360) would be a feoffment, or a devise in fee, upon condition that the feoffee or devisee should not alien the land to any person: such a condition, being inconsistent with the estate given, is void.

Before the Statute of Westminster 2, *De Donis Conditionalibus*, if lands were given to a man and the heirs of his body, as soon as he had issue of his body, this fee-simple conditional became for some purposes, and among them, for alienation, an absolute fee-simple. The effect of this statute was to convert conditional fee-simples into estates tail. [Tail, Estates.]

Conditions in English law were of feudal origin. The rents and services of the feudatory were considered as conditions essentially annexed to his fief, and were called conditions in law, or implied conditions. The neglect of these conditions was a forfeiture of the fief to the lord of whom he held his lands. Expressed conditions, or conditions in deed, were subsequently introduced, but as we have already shown, they savoured of their origin in this, that the donor's remedy for breach of conditions was limited to him and his heirs. But the doctrine of conditions has long ago been extended to all such cases as the complicated relations of a rich and populous country require, and, as in the Roman law, so now in the law of England, conditions may form a part of every written instrument by which men regulate their mutual dealings, or dispose of their property. These conditions and the construction of them, vary with the nature of the instrument of which they form a part; and the construction of such conditions is further subject to some variations, owing to the different aspect under which they are regarded by courts of law and equity.

Those conditions which are of most practical importance, are the conditions of Bonds, Leases, Mortgages, and Wills. The last head includes conditions annexed to portions and Legacies, which have given rise to a great number of disputes, and to numerous and not always consistent judicial decisions.

As to conditional limitations of real property, and the difference between them and remainders and conditions (this being a matter purely technical), the reader is referred to Fearne's *Essay on Contingent Remainders*; and Butler's note on Co. Litt., note 94.

CONDITION (Mathematics) is used in nearly the same sense as in common life. Thus the proposition, to describe an equilateral triangle upon a given straight line, is not to describe *any* triangle, but a triangle under the following *conditions*; that it must be equilateral, and that it must have a given line for its base.

An *equation of condition* means an equation which will not always be true, but requires certain conditions to be satisfied; and is distinguished from an *identical equation*, or one which is true independently of all conditions. Thus, $x + x = 2x$ and $(a + x)(a - x) = a^2 - x^2$ are identical equations: they are true for all values of x and a. But $x + 2 = 3$, and $4x - x^2 = 3$ are equations of condition: the first cannot be true unless $x = 1$, nor the second unless $x = 1$, or $x = 3$.

But the term *equation of condition* has a more technical meaning in the application of mathematics to the sciences of observation. Suppose, for example, that x, y, and z are certain quantities to be found, but which cannot be observed directly: they are however connected with each other by an equation, say $a\,x + b\,y + c\,z = h$, where, a, b, c, and h are different at different times, or for different circumstances of observation, but still are so connected that the preceding equation must be true; and where a, b, c, and h can either be observed, or computed from observations. Let a_1, b_1, c_1, and h_1 be the results of a first observation; a_2, b_2, &c., of a second; then for n different observations, we have the n following equations:—

$$a_1\,x + b_1\,y + c_1\,z = h_1$$
$$a_2\,x + b_2\,y + c_2\,z = h_2 \text{ \&c.}$$

If the observations be all correct, any three of these will give the same values of x, y, and z: but if, as must happen, there be errors in every observation, the results of each triad will differ slightly from those of the rest. For the method of solving the whole set, so as to produce the most probable result, see Probabilities, Theory of, and Least Squares, Method of. This is what is called the formation of *equations of condition*.

CONDOM, a town in the department of Gers in France, situated on the river Baise, a tributary of the Garonne, about 350 miles in a direct line south by west of Paris, in 43° 58′ N. lat. and 0° 22′ E. long.

Before the revolution, this town contained several religious houses, and a college directed by the Fathers of the Oratory. There are at present two hospitals for sick children and for soldiers. The population in 1832 amounted to 3878 for the town, or 7144 for the whole commune. The town is quite surrounded with vineyards, and considerable trade is carried on in the wine and brandy that these produce; but the chief trade is in wheat and flour. The river on which Condom stands gives motion to a great number of

corn-mills. A considerable quantity of leather, esteemed the best in this part of the country, is made and sent to Bordeaux; some woollen-yarn is spun, and quills are prepared for writing: cork-cutting is also an important branch of the trade of the place, and paper, tiles, and pottery are made. Several roads meet at Condom; and it has been proposed to open a further line of communication by rendering the Baise navigable between this town and Nérac, where the navigation now commences. Condom was pillaged by the Huguenots in the religious wars of the sixteenth century.

Condom was formerly an episcopal town. The bishopric was established in 1317 by a division of that of Agen. The revenue of a Benedictine abbey formed the revenue of the see, the abbot became the first bishop, and the monks (who were afterwards secularized) formed the chapter. Bossuet filled for some time the see of Condom.

Condom is the chief town of an arrondissement containing, in 1832, 71,487 inhabitants. The district of Condomois, of which it was formerly the capital, was bounded on the north by the Agenois and Bazadois, on the east by La Lomagne (a part of Armagnac), on the south by Armagnac Proper, and on the west by the district of Marsan. [CHALOSSE.] Some of our authorities comprehend the district of Marsan in the Condomois. In it were the towns of Nérac (pop. 3566 for the town, 6327 for the whole commune) and Mezin (pop. 1962 for the town, 3146 for the whole commune).

CONDOR, or CUNTUR (Zoology), one of the largest of the known *Vulturidæ*, of whose size and strength such exaggerated accounts were formerly current, and whose true history and dimensions have been ascertained only within these few years. The bird was compared to the Roc of the Arabian romance writers; nay, by some, it was considered identical with that monstrous oriental conception. In the 'Musæum Tradescantianum,' under title 'Clawes,' we find 'the claw of the bird Rock, who, as authors report, is able to trusse an elephant.' This may have been the claw of a condor, exaggerated by some of the artists who wrought extraordinary zoological forms for the collectors of the day. Near the passage quoted there is a notice of a toucan's (Aracari's) bill, and other parts of birds from Brazil and 'the West Indias.' In the old French Encyclopédie, after noticing Condamine's statement, the writer adds that it is believed that these birds exist also in the region of Sophala, of the Caffres, and of Monomotapa, as far as the kingdom of Angola, and that it is supposed that they do not differ from those which the Arabians call *rouh*.

Ray, in his Synopsis, confesses that, such was the enormous and almost incredible magnitude attributed to it, that he at one time considered the Condor the mere offspring of fiction, that he dared not insert the bird in Willughby's Ornithology, and that it was to Sir Hans Sloane, who possessed a feather plucked from the wing of one shot on the coast of Chile, and presented to him by Captain Strong, who gave him at the same time the measurement of the bird, that he first owed his belief of its existence.

Joseph Acosta, Garcilasso de la Vega, and John de Laet, all speak of this vulture. Acosta says that the birds called condors are of great magnitude, and of such strength that they are not only able to eviscerate and devour a sheep, but even an entire calf. Garcilasso enumerates among the rapacious birds those called *Cuntur*, and corruptly by the Spaniards *Condor*, and states that some of those killed by the Spaniards measured fifteen or sixteen feet from tip to tip of the extended wings. He further observes that nature, in order to temper their ferocity and strength, has denied them the crooked talons which she has bestowed on the eagle, and given them claws more like those of the gallinaceous birds; but that she has, however, endowed them with a beak sufficiently strong to perforate and tear off a bull's hide, and to rip out its entrails. Two of them, he adds, will dare to attack a cow or a bull, and will devour it; 'neither do they abstain from the human race; but will set upon and slay, single-handed, boys of ten or twelve years, and it is by a providence of nature, for the protection of the flocks and the natives, that many are not hatched; for, if they were numerous, they would cause great slaughter among the herds, and the greatest damage to the inhabitants.' The account given by John de Laet, who speaks of the 'vasta moles' of the bird, is much the same with that of Garcilasso.

In relation to the condor's alleged attack upon children, Condamine notices a story of the Indians setting up a figure of a child made of very viscous clay; on this the condors were said to pounce, and so entangle their claws that they were held fast.

Feuillée and Molina speak more moderately of the condor; and the former gives the extent of the wings as eleven feet four inches only. The latter can hardly have seen the bird, though he was a native of Chile; for he lays down false characters for the distinction of the sexes, says nothing of the singular comb, and observes that the condor does not differ from the lämmergeyer (*Gypäetus barbatus, Vultur barbatus*).

Abbeville assures his readers that it is twice the size of the most colossal eagle. Desmarchais gives eighteen feet as the extent of the wings, which, he says, are so enormous that the bird can never enter the forest; and he adds that it will attack a man, and carry off a stag. Linnæus seems to have drawn up his account of the habits of the bird from the writers above noticed, some of which he quotes. 'It preys,' says Linnæus, 'on calves, sheep, nay, on boys of ten years; a pair will tear up and devour a cow;' and he adds that the rushing of its wings, as it nears the earth, renders men planet-struck, as it were, and almost deafens them—'in terram devolans, susurro attonitos et surdos fere reddit homines:' he makes the alar extent from thirteen to sixteen feet. These marvellous stories were left to work upon the minds of men always prone to receive the wild and the wonderful; for, till within the last twenty-five years, one or two specimens, and those not perfect, were the only evidences of the condor in the cabinets of Europe.

The *Great Vulture of the Andes* was a striking instance of the way in which things imperfectly known are exaggerated; it was with the Condor, observes Vieillot, as it was with the Patagonians,—both shrank before examination. To the scrutiny of the Baron Von Humboldt and of M. Bonpland we owe the reduction of the bird to its proper dimensions. Nestling, in the most solitary places, often upon the ridges of rocks which border the lower limit of perpetual snow, and crowned with its extraordinary comb, the condor for a long time appeared to the eyes of Humboldt himself as a winged giant, and he avows that it was only the measurement of the dead bird that dissipated this optical illusion. The grand scenery amid which it is found had a precisely contrary effect on Lieutenant Maw *, who, in describing his descent into the deep and narrow valley of Magdalena, says, 'whilst descending, several condors hovered round us, and about the rocks on which they build their nests; but so vast was the scale of the rocks and mountains, that even these immense birds appeared quite insignificant, and I doubted for a time that they were condors.'

Under the name of *zopilote*, a word derived from the Mexican word *tzopilotl*, which is said to signify 'king of the vultures,' M. Vieillot places the condor in the same genus with the bird usually termed 'the king of the vultures' (*Vultur papa* of Linnæus and others), and the Californian vulture (*Vultur californianus*, Lath. and others). His Latin name for this genus is *gypagus*. Mr. Bennett adopts this arrangement, and, as his description of the bird is accurate, and evidently made from personal observation, we give it the preference. 'The condor,' writes Mr. Bennett, whose loss is deeply felt by zoologists in general, and by the Zoological Society in particular, 'forms the type of a genus, a second species of which is the *Vultur papa* of Linnæus, the king of the vultures of British writers. They are both peculiar to the New World, but approach in their most essential characters very closely to the vultures of the Old Continent, differing from the latter principally in the large, fleshy, or rather cartilaginous, caruncle which surmounts their beaks; in the large size of their oval and longitudinal nostrils, placed almost at the very extremity of the cere; and in the comparative length of their quill-feathers, the third being the longest of the series. The most important of these differences, the size and position of their nostrils, appears to be well calculated to add to the already highly powerful sense of smell possessed by the typical vultures, and for which these birds have been almost proverbially celebrated from the earliest ages. There is also a third species, the Californian vulture, two noble specimens of which, the only pair in Europe, are preserved in the Society's museum, rivalling the condor in bulk, and agreeing in every respect with the generic characters of the

* 'Journal of a Passage from the Pacific to the Atlantic,' &c.; by Henry Lister Maw, Lieut., R.N.

group, except in the existence of the caruncle, of which they are entirely destitute.

'In size, the condor is little, if at all, superior to the bearded griffin, the lämmergeyer of the Alps, with which Buffon was disposed conjecturally to confound it, but to which it bears at most but a distant relation. The greatest authentic measurement scarcely carries the extent of its wings beyond fourteen feet; and it appears rarely to attain so gigantic a size. M. Humboldt met with none that exceeded nine feet, and was assured by many credible inhabitants of the province of Quito that they had never shot any that measured more than eleven. The length of a male specimen somewhat less than nine feet in expanse was three feet three inches from the tip of the beak to the extremity of the tail; and its height, when perching, with the neck partly withdrawn, two feet eight inches. Its beak was two inches and three-quarters in length, and an inch and a quarter in depth when closed.

'The beak of the condor is straight at the base, but the upper mandible becomes arched towards the point, and terminates in a strong and well-curved hook. The basal half is of an ash brown, and the remaining portion, towards the point, is nearly white. The head and neck are bare of feathers, and covered with a hard, wrinkled, dusky reddish skin, on which are scattered some short brown or blackish hairs. On the top of the head, which is much flattened above, and extending some distance along the beak, is attached an oblong firm caruncle or comb, covered by a continuation of the skin which invests the head. This organ is peculiar to the male. It is connected to the beak only in its anterior part, and is separated from it at the base in such a manner as to allow of a free passage of the air to the large oval nostrils, which are situated beneath it at that part. Behind the eyes, which are somewhat elongated, and not sunk beneath the general surface of the head, the skin of the neck is, as it were, gathered into a series of descending folds, extending obliquely from the back of the head over the temples, to the under side of the neck, and there connected anteriorly with a lax membrane or wattle, capable of being dilated at pleasure, like that of the common turkey. The neck is marked by numerous deep parallel folds, produced by the habit of retracting the head, in which the bird indulges when at rest. In this position scarcely any part of the neck is visible.

'Round the lower part of the neck, both sexes, the female as well as the male, are furnished with a broad white ruff of downy feathers, which forms the line of separation between the naked skin above and the true feathers covering the body below it. All the other feathers, with the exception of the wing-coverts and the secondary quill feathers, are of a bright black, generally mingled with a greyish tinge of greater or less intensity. In the female, the wing-coverts are blackish grey; but the males have their points, and frequently as much as half their length, white. The wings of the latter are consequently distinguished from those of the female by their large white patches. The secondary quill feathers of both sexes are white on the outer side. The tail is short and wedge-shaped. The legs are excessively thick and powerful, and are coloured of a bluish grey, intermingled with whitish streaks. Their elongated toes are united at the base by a loose but very apparent membrane, and are terminated by long black talons of considerable thickness, but very little curved. The hinder toe is much shorter than the rest, and its talon, although more distinctly curved, is equally wanting in strength; a deficiency which renders the foot much less powerful as an organ of prehension than that of any other of the large birds of the raptorial order.'

Geographical Distribution.—The Andes, and the greater part of the vast mountain-chain which runs up South America, to lat. 7° N., but most common in Peru and Chile.

Habits, Nest, &c.—The condor is found most frequently at an elevation of from 10,000 to 15,000 feet above the level of the sea, and there they are to be seen in groups of three or four, but never in large companies, like the true vultures. Many of the clusters of rocks and of the elevated plateaux are named after them: *Cuntur Kahug*, *Cuntur Palti*, and *Cuntur Huasuna*, for example—names which, in the language of the Incas, are said to signify the Condor's Look-out, the Condor's Roost, and the Condor's Nest. In this rarefied atmosphere the bird breathes freely, and resorts to the plains only when impelled by hunger. Then two of them will attack the vicuna, the guanaco, the heifer, and even the puma, the lion of South America, persecuting the tormented quadruped till, overpowered, it falls beneath the wounds inflicted by their claws and beaks, groaning, and protruding its tongue. Upon this and the eyes, their favourite morsels, the condors instantly seize, and the bloody banquet is continued till they are quite gorged. Humboldt saw them after such repasts sitting sullen and sombre on the rocks; and when thus overloaded, they will suffer themselves to be driven before the hunter rather than take wing. But he has also seen them, when on the look-out for prey, and especially on serene days, soaring at a prodigious height, as if for the purpose of commanding the most extensive view. 'C'est l'oiseau [illegible] der, speaking of the condor, ' [illegible] th regard to the stories of [illegible] Humboldt never heard of [illegible] though [illegible] of the Indians who [illegible] frequently left sleeping in the open air [illegible] of these birds. He often approached [illegible] three or four of them as they sat on the [illegible] never manifested any disposition to attack [illegible] Indians of Quito assured him that man [illegible] from condors: he admits indeed that two [illegible] vultures would be dangerous antagonists for a single [illegible] to cope with; and Sir Francis Head describes a severe struggle between one of them and a Cornish miner with his usual graphic power. When the bird descends into the plains, it rarely perches on trees, preferring the ground, for standing and walking on which its [illegible] and straight claws are better adapted.

Humboldt was assured that the eggs, which are white, and three or four inches in length, are deposited on the bare rock without any border of straw or other defence. The young ones are said to remain with the female during one year. The nestlings have no feathers; their bodies for some months are covered with a very fine curling whitish down or hair, something like that of young owls; and they are so puffed out by this envelope, that they look almost larger than adults. At the age of two years, the condor is not yet black, but of a yellowish brown; up to this time, the female has no appearance of the white ruff (*gollila* of the Spaniards), and it is owing to want of observation on this change of plumage that many naturalists and travellers, nay, the inhabitants of Peru themselves, talk of two species of condor, the black and the brown (*Condor negro y Condor pardo*). Thus Lieutenant Maw, in the sequel to the passage above quoted, says, 'There were two kinds of condors; one dark brown, the other white on the back, with half the upper side of the wings next the back, and a white ring round the neck.'

Chace.—At Peru, Quito, and in the province of Popayne, condors are taken alive with the lasso. To this end a cow or a horse is killed. Down come the condors, and are permitted to gorge themselves. Then the Indians, with their lassos, appear on the scene, and soon capture them. When one of the birds finds itself hampered, it makes incredible efforts to raise itself in the air, and succeeds, after vomiting freely. The Spaniards call this sport *correr buitres*, and it is, next to the bull-feasts, the great amusement of the country people. In other countries it is said that poisonous herbs are placed in the belly of the quadruped that serves as a bait, and then the condors appear as if intoxicated after their meal.

The tenacity of life exhibited by the condor almost rivals the account which we have given of the endurance of the grisly bear. (BEAR, vol. iv. p. 88.) Humboldt relates that at Riobamba he saw some Indians first strangle one with a lasso and hang it on a tree, pulling it forcibly by the feet for some minutes. The lasso was hardly removed when the condor arose, and walked about as if nothing extraordinary had happened. At less than four paces, three balls were then discharged from a pistol at it, all of which entered its body, wounding it in the neck, chest, and abdomen: the bird still kept its legs. Another ball broke its thigh, and brought it to the ground; but the wretched creature did not die till after an interval of half an hour. Ulloa asserts that in the colder parts of Peru the skin of the condor is so thickly covered with feathers, that eight or ten balls may be heard to strike it without penetrating its body.

This celebrated vulture, *Vultur Gryphus* of Linnæus, *Gypagus Griffus* of Vieillot, *Sarcoramphus Gryphus* of Duméril, is said to possess a most exquisite sense of smell,

ing. It may be doubted, however, whether, as in other vultures, the eye is not at least as great an assistant to the bird in discovering its prey as the nostrils are. (Birds, vol. iv. p. 429). Lieutenant Maw saw the condor's quill used as a pen in the Cordillera (Toulea).

The Zoological Society of London have now made this form, of which such romantic tales were told and credited, familiar to the whole population of the metropolis. It is a striking contrast, to rise from the perusal of one of these marvellous stories, and look at the living bird in the Regent's Park.



[Sarcoramphus Gryphus, male.]

CONDORCET, MARIE-JEAN-ANTOINE-NICOLAS CARITAT, MARQUIS DE, was born in Picardy in 1743. His family owed their name and title to the castle of Condorcet, near Nion, in Dauphiny. His uncle, the bishop of Lisieux, who died in 1783, superintended his education, and was the means of procuring for him the most powerful patronage as soon as he was old enough to be introduced into public life. He first distinguished himself as a mathematician, and his success in this department soon opened to him the door of the Academy of Sciences.

It is on his application of philosophy to subjects connected with the happiness of mankind and the amelioration of social institutions that his fame chiefly rests. The friend of D'Alembert and of his illustrious contemporaries, Condorcet was one of the warmest and most distinguished of Voltaire's disciples. He cannot, it is true, be placed in the first rank, either as a deep thinker or original writer; nevertheless his meditative and lofty mind, his unabated zeal in the pursuit of truth, his generous ardour, which never cooled or shrunk from the difficulties which it had to encounter, his perseverance in applying himself to all sorts of useful pursuits, and the multiplicity of his labours, have all contributed to assign him a conspicuous place among those who have exercised an influence over the destinies of his country.

His philosophical views have been widely circulated, and the practical effect of them is still visible in our days. The main doctrine which he sought to inculcate, and which is contained in his 'Esquisse des Progrès de l'Esprit humain,' was the perfectibility of man, considered both in his individual and social capacity. According to him, the human frame and intellect, by the aid of time and education, would infallibly attain to perfection. This was the creed which he proposed to substitute in the place of the sanctions of morality and religion. This singular notion, with which he was so deeply imbued, has given to his philosophy a peculiar and special character, which distinguish it alike from the sceptical fatalism of Voltaire and the gloomy dogmatism of Diderot. In the philanthropic mind of Condorcet philosophical speculations were blended with the deepest sympathy for his fellow men, and the most unwearied activity in promoting all such reforms as he thought useful. Of his magnanimity and elevation of soul he gave ample proof in the heroic conduct which he pursued in the hour of difficulty and danger. Proscribed by the Convention as a *Girondin*, he voluntarily quitted the house of his friend Madame Vernet, which had afforded him an asylum during eight months of the first revolution, rather than expose her to the consequences of a decree which might have made it a capital crime to harbour or conceal an outlawed deputy.

Houseless, and wandering about the country round Paris, he endeavoured to conceal himself in the numerous quarries with which its neighbourhood abounds. At last the pressure of hunger drove him into a small inn in the village of Clamart, where he incautiously betrayed himself by exhibiting a pocket-book obviously too elegant for one in so destitute a condition. He was arrested, and though exhausted by want and fatigue, and with a sore foot occasioned by excessive walking, he was conveyed to Bourg-la-Reine, and thrown into a dungeon. On the morrow (28th March, 1794), he was found dead in his cell, having put a period to his existence by swallowing poison, which he always carried about him in order to avoid the ignominy of the scaffold. His mathematical works are numerous, consisting in great part of memoirs in the Transactions of the academy. In pure mathematics he devoted himself mostly to the development of the differential and integral calculus: he lived during the time when the higher parts of that science began to assume their present powerful form; and his labours on the subject of differential equations must preserve his name in connection with their history. His applications of mathematics are,—1, the problem of three bodies, in which he had no particular success; 2, the application of the mathematical theory of probabilities to judicial decisions, at that time a new and ingenious speculation, the grounds of which are generally misunderstood, but which was treated by Condorcet with a degree of power which entitles his work to no mean rank among those which have led the way to a perception of the extensive bearings of the integral calculus. Condorcet is not in the very first rank of mathematicians, but very high in the second. As a literary author, his 'Eloges des Académiciens morts depuis 1699,' procured for him the perpetual secretaryship of the Academy of Sciences, and furthered his election to the French Academy. Though decidedly inferior to Fontenelle's 'Eloges Académiques,' both in point and simplicity, they nevertheless show Condorcet to be a pure and elegant writer, as well as a good judge of the merit of others. His Lives of Voltaire and Turgot, in which these qualities are most apparent, are moreover distinguished by the enlightened philanthropy, the philosophical zeal, and that desire for improvement, which was always the strongest feeling in the author's heart. The style in which they are written is clear, and if somewhat monotonous, is not altogether devoid of force and spirit. Besides his numerous works (of which he had not time to undertake a regular and careful revision), he contributed several articles to the papers entitled the 'Feuille Villageoise,' and the 'Chronique de Paris.' But the grand work of Condorcet was his Esquisse du Progrès de l'Esprit humain, which he wrote while he was seeking refuge from proscription, and for which he had no other materials except such as he had treasured up in his own vast and capacious memory: it is a work more remarkable for depth of thought than brilliancy of style.

Another of his most remarkable productions was his 'Plan for a Constitution,' which he presented to the Convention, at whose request he had undertaken to draw up a report on public instruction. His treatise on this subject abounds in enlarged and lofty views, and contains the justest notions on the art of expanding the faculties and forming the character.

Good-nature and kindness were the foundation of his dispositions. If he was deficient in any thing, it was in imagination. His outward deportment was cold and reserved, and characterized by a certain degree of awkwardness and timidity. Nevertheless he possessed more real warmth of feeling and greatness of soul than those unacquainted with him would have suspected. D'Alembert used to characterize him as a volcano covered with snow. His private as well as public conduct was firm, disinterested, and straightforward; and being fully satisfied that a system of equality was the only

one compatible with the happiness and real interests of mankind, he made no account of his own rank, title, or fortune, but was willing to sacrifice them all to promote the darling object of his hopes and wishes.

Under the old régime, he refused the request of the Academy in 1777 to pronounce an éloge on the Duc de la Vrillière, minister of Louis XV. He subsequently resigned the place which he held under the administration, that he might avoid being brought into contact with M. Necker, whom he suspected of having intrigued against his friend Turgot. In the earlier period of the Revolution, Condorcet used every effort to bring about those changes which he had so often desired to see accomplished for the good of his country, and became an active member of the Comité des Subsistances.

It was on the occasion of being summoned, in 1789, by Louis XVI., to deliberate upon the best mode of providing for the wants of Paris, that he was forcibly struck with the intelligence displayed by the king in the discussion of this difficult and important question. 'After listening to him,' says Condorcet, 'we all looked at each other with astonishment, and felt at once that the course which he advised was in fact the only real one.'

Being called to the Convention, after the fall of the monarchy, he rallied round the Girondins in order to oppose that portion of the Assembly known by the name of Montagnards from their occupying the highest seats in the Convention.

In his efforts to found a republic in France upon a philosophical basis, Condorcet sacrificed his life to his opinions. The purity and benevolence of his intentions, and his magnanimous devotion of himself to the cause in which he had embarked, are the imperishable records of his fame. His wife, who was of the family of Grouchy, and one of the most beautiful women of her day, distinguished herself by a correct and elegant translation of Adam Smith's 'Theory of Moral Sentiments.'

Condorcet's works have been collected and published in 21 volumes 8vo.

CONDOTTIE'RI, a word in the Italian language signifying captains, chiefs, or leaders, but most usually employed to designate soldiers of fortune, who raised corps of cavalry and infantry at their own expense, and engaged with princes and governments for their services as mercenaries. The practice of employing these mercenaries, which commenced in the early part of the fourteenth century, originated in the Italian princes and republics commuting the personal services of their subjects in war for pecuniary payments, with which they were enabled to hire mercenaries. As early as 1225, Genoa took the Count of Savoy into pay with 200 horse. Florence retained 500 French lancers in 1282. After the expedition of the Emperor Henry VII. in 1310, many soldiers of fortune remained in the service of Milan, Florence, and other states. Pisa appears, in 1343, to have disbanded a corps of German mercenaries, whose leader, Guarnieri, refusing to lay down his arms, levied contributions throughout the Italian states. In 1353, a band under the command of Fra Morialo, afterwards of Conrad Lando, called the Great Company, appeared in Italy, and extorted money from many of the Italian states. During the long and bloody wars between our Edward III. and France, foreigners from different parts of Europe, attracted by his fame and liberality, and allured by the hope of plunder, flocked to his standard. They were for the most part men of desperate fortunes, or unable to live at home according to their wishes. At the conclusion of the treaty of Bretigni in 1364, which restored peace to England and France, these soldiers, unable to relinquish a course of life to which they were accustomed, and being without other means of subsistence, were dispersed into the several provinces of France, where they possessed themselves of castles and fortresses, and associating themselves with the banditti of their vicinities, levied contributions on all within their power, and under the names of *companies* or *companions**, they became the terror of the peaceable inhabitants of the country. These ruffians formed altogether a body of 40,000 men, and were headed in many instances by some of the most experienced leaders of the time. They fought pitched battles with the troops of France, in which they gained victories. The misery which they occasioned only served to increase their numbers; for poverty and despair drove their victims to their standard. Even their excommunication by the Pope produced no abatement in their ferocity and rapine. At length, the war between Henry de Transtamare and Peter the Cruel for the succession to the crown of Castile furnished an opportunity to rid France of this scourge. Du Guesclin proposed to Charles V., King of France, to enlist these companies into his service and lead them into Castile. They accordingly engaged in this expedition, and in their way forced the Pope, then residing at Avignon, to give them a sum of money. From this time war became a trade in many parts of Europe, particularly in the Italian states, in which needy and desperate adventurers raised forces either by their pecuniary means or by their personal influence and reputation for conduct and courage, and engaged them for hire without the least consideration for the real or supposed justice of the cause in which they embarked. These forces were recruited from the refuse or the vagabonds of every state in Europe. The idle and profligate found in joining these bands a way of life which flattered their indolence and gratified their rapacity. The mode adopted for assembling them was by contracts with nobles who had authority over the loose and disorderly inhabitants of their estates, with captains whose address or bravery could allure adventurers to their banners, or with individuals whose poverty or choice made them offer themselves to princes or governments. In their discipline, though it was far from exact, and in courage and conduct in war, they were superior to the troops which could be then raised under the powers of the feudal system. Besides the profit which they gained on the ransom of their prisoners, their pay, according to the then value of money, appears to have been high (assuming them to have been as well paid as the other troops), and that of the private soldiers to have been at a much higher rate in proportion to the commanders and officers than in modern times. At the siege of Calais, in 1346, Edward Prince of Wales, for himself and retinue, for his wages of war, had 20*s.* a day. The pay of Henry Earl of Lancaster, for his 'wages of war,' was 6*s.* 8*d.* a day; 11 bannerets, 4*s.* a day; 193 knights, 2*s.*; 512 esquires, 1*s.*; 46 men-at-arms and 612 archers on horseback each 6*d.* a day. From the known rapacity of these mercenaries, it is not likely that they would have accepted lower terms than the other troops engaged in the same enterprize. According to Villani, they frequently demanded and received double pay with a premium or bounty-money of a month's pay on their engagements. It is difficult to state what was the exact amount, but it is conjectured that the pay of a private cuirassier was more than that of a subaltern officer of the present day. But their chief inducement to serve was the plunder of the towns or castles which they took, the contributions they levied, and the ransom of the prisoners. From this motive they were induced not only to spare their own men as much as possible, but to give quarter to their enemies. This rendered some of their battles nearly bloodless, a ludicrous instance of which occurred in one of the Italian wars. Piccinino advanced to attack Florence with an army of several thousand men. The place was defended by Capponi with another body, principally composed of mercenaries. The two armies engaged at Anghiari, a short distance from Florence. The battle lasted four hours. Piccinino was totally defeated, and fled to Borgo San Sepolcro with about a thousand men. The rest were made prisoners; only one man was killed, and this owing to the accident of his falling from his horse and being trodden under foot. Capponi, however, was unable to follow up his success, and his troops refused to advance till they had secured their plunder. Several other battles, equally bloodless, were fought in the wars of this period.

The Condottieri were notorious for bad faith in their engagements with the states they served. Their rapacity was equal to their bad faith; besides their pay, they exacted gratifications for every success. Such was the terror they inspired, that some of the Italian states paid them large sums not to pass through their territories. With the improvement of artillery and the introduction of musquetry the condottieri declined; but it is difficult to state the period of their extinction. Our countryman, Sir John Hawkwood, is said to have been the last, as he was beyond comparison the most eminent for his skill in military affairs. Sir John died at Florence in 1393 at an advanced age, and was buried with great pomp by the Florentines. There is a cenotaph to his memory in the church of Siblo Heding-

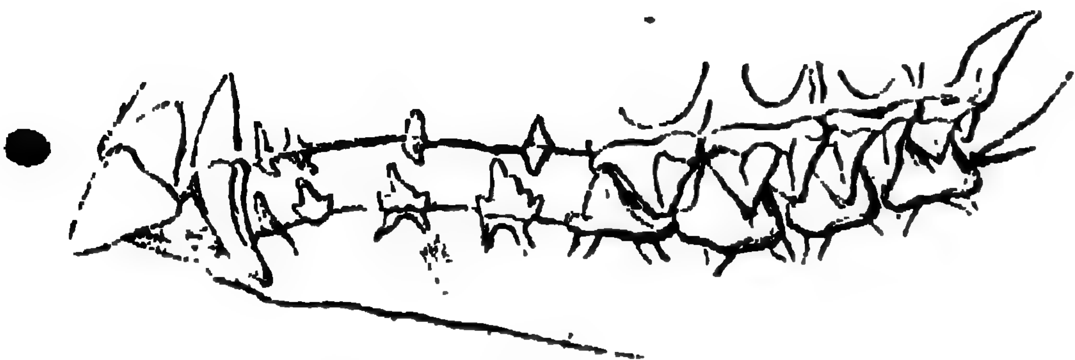
* They were sometimes called cotelli, probably a corruption of coltelli, from their bearing knives, or large daggers.

ham, Essex, where he was born. (Froissart, Villani, Machiavelli, Aretin).

CONDYLU'RA (Zoology), Illiger's name for a genus of insectivorous mammifers, founded on the *sorex cristatus* of Linnæus. Cuvier observes that Desmarest was the first who made the dentition of the genus known.

Generic character.—*Body* thick, furry; *muzzle* much elongated, bordered with membranous crests, disposed star-like round the opening of the nostrils; no external *auricles; eyes* extremely small; *anterior feet* short, large, with five toes, furnished with robust claws proper for digging; *posterior feet* slender, with five toes; length of tail moderate.

Dental formula: incisors $\frac{2}{4}$, canines $\frac{1-1}{1-1}$, molars $\frac{8-8}{7-7}=40$.



[Teeth of Condylura cristata. F. Cuv.]

Lesson observes that the generic name rests on an error made by La Faille, who had represented the radiated mole with knotty swellings on the tail; but it is generally received by zoologists, and will be retained. The genus is analogous to the Moles and to *Scalops*.

Geographical distribution.—Entirely confined to North America, as far as is known at present. Speaking of some specimens of *Condylura longicaudata* in the Museum of the Zoological Society, obtained from Moose Factory, Hudson's Bay, Dr. Richardson says, 'They were not accompanied by any account of their habits, or notice of the exact locality where they were killed; but, as the most southern fur posts depending upon Moose Factory are situated upon the borders of Lake Superior, it is probable that they came from that quarter. Pennant's specimen was received from New York.'

The known species are not numerous. Example:—*Condylura macroura* (Harlan). *Thick-tailed, star-nose.* The following is Dr. Richardson's description of a specimen presented to him by the unfortunate Mr. David Douglas, and which the latter had procured on the banks of the Columbia River.

'The *head* is remarkably large; the body is thick and short, and becomes narrower towards the tail, and the hind legs are consequently nearer to each other than the fore-ones. The nose is rather thick, and projects beyond the mouth; it is naked towards its end, is marked with a furrow above, and terminates in a flat surface, which is surrounded by 17 cartilaginous processes, with two more anterior ones situated above the nostrils, and a pair of forked ones immediately below the nostrils. The surfaces of these processes are minutely granulated. Some white whiskers spring from the side of the nose, and reach about half the length of the head. There are others not so long on the upper and under lips. The *fur* on the body is very soft and fine, and has considerable lustre. It is longer than the fur of the other two known species. Its colour on the dorsal aspect is dark umber brown, approaching to blackish-brown. On the belly it is pale liver-brown. When the fur is blown aside, it exhibits a shining blackish-grey colour towards its roots. It is longer on the hind-head and neck than on the belly. The *tail* is narrow at its origin, but it suddenly swells to an inch and a half in circumference; it then tapers gradually until it ends in a fine point, formed by a pencil of hairs, about half an inch long. It is round, or very slightly compressed, and is covered with scales about as large as those on the feet, and with short, tapering, acute hairs, which do not conceal the scales. The hairs covering the upper surface of the tail are nearly black; those beneath are of a browner hue. The *extremities* are shaped almost precisely like those of the *Condylura longicaudata.* Only the palms and toes of the *fore-feet* project beyond the body. The palms are nearly circular, and are protected by a granulated skin, like shagreen. The sides of the feet are furnished with long, white hairs, which curve in over the palms. The five toes are very short, equal to each other in length, and, together with the back of the hands, are covered with hexagonal scales. The *fore-claws* are white, nearly straight, broadly linear, and acute, convex above and flat beneath. The palms turn obliquely outwards, which causes the fourth claw to project rather furthest; but the third one measures as much, the second is shorter, and the first and fifth are equal to each other, and a little shorter than the rest. The *hind-feet* are also turned obliquely outwards, and are scaly, with a few interspersed hairs above, and granulated underneath. The sides are narrow, and present a conspicuous callous tubercle, posterior to the origin of the inner toe. The hind legs are very short, and are clothed with soft brown hair, a tuft of which curves over the heel. There are no hairs on the sides of the hind-feet, like those which form a margin to the fore ones. The hind toes are longer than the fore ones, and are armed with more slender claws, which are white, awl-shaped, curved, and acute. They have a narrow groove towards their points underneath. Length of the head and body, 4 inches 3 lines; of the head, 1 inch 6 lines; of the tail, 2 inches 6 lines, including the pencil of hairs at its extremity, 3 inches 3 lines; naked part of the nose, exclusive of the awl-shaped processes, 2½ lines,' &c. (*Fauna Boreali-Americana*, vol. i., p. 284.)

Dr. Godman observes, that though the external ear in *Condylura cristata* is destitute of auricle, it is very extensive, and is situated at a short distance from the shoulder, in the broad triangular fold of integument connecting the fore-arm and head.



[Condylura Macroura.]

N.B.—M. Latreille has employed the term *Condylura* to designate a genus of *Branchiopoda.* [BRANCHIOPODA, vol. v. p. 340.]

CONE (Mathematics). In the most general sense, a cone is a surface formed by the motion of a straight line indefinitely extended in both directions, and which always passes through one given point (called the vertex). Any curve in space may be a guiding line (or directrix) through which the moving straight line may be made to pass.

But in common language the term cone is only applied to those general cones in which the directrix is a circle. Of these there are two kinds: the *oblique* cone, when the vertex is not in the axis of the directing circle (the axis being the perpendicular drawn to the plane of the circle through its centre); the *right* cone, in which the vertex is in the axis. The most prominent distinction between these two kinds of cones is this: that the oblique cone has two distinct sets of circular sections, whose planes are not parallel to each other [SUBCONTRARY], while the right cone has only one set of circular sections, all parallel to the directing circle.

The right cone is an infinitely extended surface, or consists of two cones (according to the most common notion) joined together by the vertex: but out of mathematics a portion of such cone is called a cone contained between the vertex and the directing circle, then called the *base.* In the rest of this article we shall use this meaning of the word.

The surface of a cone is one half the circumference of its base multiplied by the distance from the vertex to the circumference of the base (called the *slant side*). Thus the

diameter of the base being 10 inches, or the circumference 31·416 inches, and the slant side being 20 inches, the surface of the cone is ½ × 20 × 31·416, or 314·16 square inches. The cone unrolled gives a sector of a circle, the angle of which, in theoretical units (see ANGLE), is the circumference of the base divided by the slant side. Thus in the preceding instance 31·416 ÷ 20, or 1·5708 is the angle of the unrolled cone, which is a right angle.

The solidity of a cone is one third of the product of the area of the base and the perpendicular distance of the vertex from the axis. In the preceding instance the perpendicular aforesaid is

$$\sqrt{(\text{slant side})^2 - (\text{rad. of base})^2}, \quad \text{or} \sqrt{400 - 25}.$$

or $\sqrt{375}$, or 19·3649 inches. The area of the base is 3·1416 × 25, or 78·54 square inches; and this multiplied by one third of 19·3649, or 6·455, is 506·976, the number of cubic inches in the cone. The centre of gravity of a cone is in the axis, at a distance from the centre of the base equal to one fourth the distance of the vertex.

CONESSI BARK, the produce of Wright's anti-dysenterica, an apocynaceous plant, native of the coasts of the peninsula of India, especially in Malabar.

CONFARREATION. [MARRIAGE.]

CONFEDERATION OF THE RHINE. [BONAPARTE, p. 134.]

CONFERENCE at Hampton Court, was held on the 14th, 16th, and 18th January, 1604, in the presence of King James I., who took a leading part in the discussion, between nineteen bishops and inferior clergymen of the Church of England, and four Presbyterian or Puritan divines, to argue certain objections to the doctrine and discipline of the Church, respecting which the Puritans had petitioned his Majesty. It was followed by no result.

CONFERVÆ, a name sometimes considered synonymous with Algæ. [ALGÆ.] It is limited in systematic botany to a section of Algæ, consisting of simple tubular jointed species inhabiting fresh water.

CONFESSION means a solemn acknowledgement of some principle or fact. Hence the early Christians, who suffered imprisonment and other penalties from the Roman magistrates for having publicly declared their belief in the gospel, were called confessors. Others, in later times, acquired the same title from having embraced a life of austerity, or retired to some solitude or convent to do penance for their sins. Confession thus became synonymous with penitence, in which sense both words are understood by the Roman Catholics. The practice of confessing one's sins either in public before the congregation of the faithful, or privately to a priest, dates undoubtedly from the earliest ages of the church. In those times the Christians, scattered about the Roman world, and exposed to persecution, formed many small communities, living under the discipline of their presbyters, who knew every individual of their respective flocks, the members of which watched carefully over each other's conduct. Any gross irregularity or any compliance with heathen rites by one of the flock was sure to be known to the rest, and the offender was thereby subject to interdiction from Christian worship and communion. If he wished to be re-admitted to the communion of the church, he must publicly acknowledge and repent of his guilt, and submit to the penance imposed by the presbyter. This appears to have been the original mode of confession. It does not seem to be clearly determined when the practice of private, or 'auricular,' was substituted for public, confession. Cyprian, who lived towards the middle of the third century (*Epist.* Rom. 12), defines several kinds of sins for which penance ought to be done before the transgressor could be admitted to the communion; and in his treatise *De Lapsis in Persecutionibus*, he exhorts those who have fallen into heathen practices to confess their sins to the ministers of God, and thus unburthen their souls of their weight, 'because this satisfaction and the remission by the priest are acceptable to God.' Tertullian, who lived at the beginning of the same century, says (*De Pœnitentiâ*, ch. ix.) that penitence consists of three parts, confession, contrition, and satisfaction. In the eastern churches the custom of confessing sins before the assembled congregation was prevalent down to the fourth century, but the practice having led to scandal, especially on the occasion of a lady revealing that she had been seduced by a deacon, Nacterius, patriarch of Constantinople, abolished the custom, and removed the pœnitentiarius or priest ('qui præpositus erat pœnitentiæ') by whose advice the revelation had taken place. (Sozomen, *Histor.*, lib. vii.) Some passages of Chrysostom have been urged against the obligatory practice of confession. In Homily 11, he says, 'God commands that to him alone we should give account of our conduct, and to him we should confess;' which agrees with the principle and practice of the Protestant and reformed churches. Yet in his Homily of the Samaritan woman, he says, 'He who blushes now to reveal his sins to a man, and will not confess, at the last day will be arraigned not before one or two persons, but before the whole world.' In the fifth century, Pope St. Leo I., called the Great (*Epist.* Rom. lxxx. ch. 5), says that the priests ought not to enforce 'public confession of secret sins,' but that it is enough if the penitent confess them privately to a priest. This passage seems to throw some light on the transition from public to private confession. When and under what circumstances, confession, either public or private, was deemed absolutely necessary for the remission of sins, is another subject of controversy. Innocent III., in the fourth Lateran council, A.D. 1215 (Canon 21), made confession (meaning auricular or private) obligatory upon every adult person once a year, and that continues to be one of the rules of the Roman Catholic church to the present day, which numbers penitence among the sacraments. The Council of Trent, in its Catechism, defines it to be 'a declaration by the penitent of his sins, made to a priest in order to receive the penance and absolution.' Penitence therefore consists of four parts, confession, contrition, absolution, and penance; and it is a positive doctrine of the same church, that without the concurrence of all these parts or conditions, the sacrament is null and void. The penitent is also obliged to confess all the sins that he can recollect having committed and not confessed before, at least all the mortal sins, for Roman Catholic dogmatists draw a distinction between mortal and venial sins. By contrition it is meant that the penitent should fully repent of his guilt, and form at the same time a firm resolution not to sin again, without which repentance and resolution the absolution of the priest is of no avail, being always conditional upon a corresponding disposition on the part of the penitent. It is not therefore true, as it is often erroneously stated, that the priest can absolve from any sins by merely pronouncing the words, 'Ego te absolvo,' &c.; it is the penitent who, by his contrition and trust in the merits of the Saviour only, can give effect to the words of the priest, and in this respect the principle is common to all the Christian churches, except the formula of the absolution, which differs in some, while others omit it altogether. [ABSOLUTION.] The indispensable condition for obtaining absolution is often explained and inculcated from the pulpits and chairs of theology in Catholic countries, though it happens of course that ignorant or weak people overlook or misconceive the absolute necessity of inward contrition, and think that by merely confessing their sins and reciting the formula of repentance with their lips, they have acquitted themselves of their part, and that the priest can do the rest. Again, the priest absolves 'à culpâ, sed non à pœnâ;' he removes the guilt, but not the punishment, here or hereafter; and accordingly Roman Catholics admit a purgatory. The penance which the priest imposes consists generally of satisfaction to be given if the penitent has injured any one in his property, honour, &c., in a manner that can admit of reparation, and also of prayers, abstinence, or other religious practices to be performed. A really virtuous and enlightened confessor can often effect much good in this manner, and restore peace and happiness to families. The secrecy imposed on confessors is strict and unconditional; whatever be the crime of which a penitent may accuse himself, they are solemnly bound to keep it secret, under the most severe denunciations and penalties, both here and hereafter, that of excommunication ipso facto included. Notwithstanding the number of individuals who have exercised the office of confessors all over the Catholic world, and the manifold temptations to which they are exposed, there are few authenticated instances of their having betrayed their trust. That there may be other inconveniences likely to result from private confession, is another question, which it is not our business to discuss. Every priest is not a confessor, although every incumbent of a parish is. The qualifications of age, studies, character, &c. required in a candidate for the office of confessor, the solemn engagements he enters into, and the formalities with which he is consecrated by

the bishop, may be seen in the professional works of discipline of the church of Rome, and, among others, in the *Bibliothèque Sacrée* des Pères Richard and Giraud, Paris, 1825, art. 'Confession' and 'Confesseur.'

The box in which the priest sits in the church to hear the penitent is called a confessional. But the act of confession may be performed out of church, in private houses, in the field, in any place in short, provided it be not within hearing of any person except the priest and the penitent.

The Greek church retains the practice of auricular confession, but differs from that of Rome in the form of the absolution. The Protestant and reformed churches, including those of England and Scotland, do not admit the practice, but recommend every one to confess his sins to God, and to repent in order to obtain forgiveness.

Confession is also the name given to the solemn profession of faith of various Christian churches which dissent from that of Rome, such as the Lutheran [AUGSBURG, CONFESSION OF]; that of the reformed churches of France, in 40 articles, signed by Henry, king of Navarre, the prince of Condé, Coligny, and others, and presented to Charles IX. in 1561; that of the Helvetic reformed churches proclaimed in 1566 [ZUINGLI]; that of the churches of the Netherlands, consisting of 37 articles, and published in 1562, afterwards approved and signed by the members of the synod of Embden, in 1571, and lastly examined and confirmed in 1619 by the synod of Dordrecht [ARMINIUS]; and also that of the Protestant churches of Poland, printed in 1570 at Dobrzin, and afterwards approved at the synod of Sendomir.

Some sepulchres of martyrs have been styled by antiquaries confessions; for instance, the subterraneous chapel, in which are the sepulchres of St. Peter and St. Paul, under St. Peter's at Rome, is called 'the Confession of St. Peter.'

CONFESSION OF AUGSBURG. [AUGSBURG.]

CONFIRMATION is, according to the Church of England, 'the rite of laying on of hands upon those who have been baptized, and are come to years of discretion.' Such only are qualified to be confirmed as can say the Creed, the Lord's Prayer, the Ten Commandments, and the Church Catechism; to the end that children having learned what their godfathers and godmothers promised for them in baptism, they may themselves ratify and confirm the same; acknowledging themselves 'bound to believe and to do' all which those persons undertook for them. It is affirmed in the sixtieth canon of the Anglican church, that confirmation is 'a solemn, antient, and laudable custom in the church of God, continued from the apostolic times.' On the other hand, among the Protestant Dissenters it is regarded merely as the remnant of a Popish ceremony; with the assertion, that there is no more authority for that which is retained of it than for that which is rejected. The passages of scripture which are always adduced in support of this episcopal imposition of hands are the three following; namely, Acts viii. 14-17, Acts xix. 6, and especially Hebr. vi. 1, where ἐπίθεσις χειρῶν, 'the imposition of hands,' appears to be mentioned as an important rite of the Christian religion. But Dissenters disallow this mode of proving the propriety of the imposition of episcopal hands. They deny it to be a legitimate inference from the miraculous act of inspired Apostles to the act of modern bishops. What warrant, they ask, has a bishop to declare that God has given unto an assemblage of several hundreds of individuals 'the forgiveness of all their sins,' because they can say the Church Catechism? (See on this question, Towgood's *Letters on Dissent*; De Laune's *Plea for the Nonconformists*, &c.) Dr. Whitby observes that, unless the Apostles laid hands on all who were baptized, it makes nothing for confirmation; and that if they did, then Simon Magus received the Holy Ghost. The early fathers certainly believed the Holy Ghost to be indeed conveyed by the imposition of hands. 'When we come out of the water,' says Tertullian (*De Baptismo*, c. 7, 8), 'we are anointed with the holy chrism (perunguimur benedicta unctione), then we have the imposition of hands, which calls down the Holy Ghost (tradit Spiritum Sanctum Paraclitum).' *De Resurrec. Carnis*, c. 8; Hieron. *advers. Lucif.*, tom. ii., p. 47; Cyprian, *Epis. 73-74 ad Jub.*, and 72 *ad Steph.*) Confirmation was originally thus administered immediately after baptism, of which it formed the concluding rite or complement, and was called βεβαίωσις; that is, confirmation; nor was there any exception to this time of administering it in the case of baptism in infancy. In the Greek church, and in Asia, it still accompanies baptism. The remonstrance of the Protestants at the Reformation caused the rite to be discontinued to infants, and to be administered only to adults; and afterwards the Council of Trent altered the time for confirmation to the seventh year.

The earliest mention, by the Fathers, of the use of chrism or sacred ointment in confirmation is believed to be in the passage of Tertullian *de Baptismo*, already quoted (Bingham, b. xii., c. 3); but the church of Rome adduces the authority of the Epistle of James, ch. v., v. 14. The anointing the forehead with this holy unction, which was composed of oil and balsam, constituted the first act of the ceremony of confirmation. The consignation, or signing with the sign of the cross, was the second; and the third and last was the imposition of the bishop's hands with the invocation of the Holy Ghost. The person was then qualified to partake of the eucharist. Confirmation in the Greek church is named μυρὸν, 'ointment'; χρίσμα, 'unction'; μυρὸν τοῦ χρίσματος; σφραγὶς, 'the seal'; and ἐπισφράγισμα. In the Roman church this rite is one of their seven sacraments, and it consists in the bishop's anointing the forehead of the person, saying, 'A. B., I sign thee with the sign of the cross, and confirm thee with the chrism of salvation, in the name of the Father, and of the Son, and of the Holy Ghost.' The bishop then gives a slight blow on the cheek, and concludes with pronouncing the words Pax tecum, 'Peace be with thee.'

Lord King, in his *History of the Primitive Church*, p. 91, has shown that confirmation was originally the same thing as absolution, and that it was frequently repeated on the same individual. On the reiteration of the rite, see also Morinus *de Pœnitentiâ et Ordinatione*, l. 9.

The Puritan contempt for the hierarchy occasioned confirmation to become greatly neglected after the Protestant Reformation in England (Hooker, l. 5, 66; Bishop Hall's χειροθεσία); but subsequent to that period the church of England has observed the rite with much more strictness than the Lutheran or any other church.

Du Pin (*Study of Divinity*, p. 216) gives a numerous list of writers on the subject. (Bingham's *Origines Ecclesiasticæ*, vol. iii., p. 286, *et seq.*; Hammond *de Confirmatione*; Bishop Parker *on Confirmation*; Goar's *Euchologia*, p. 368; Gratian, *Concordantia Discordantium*, part. iii.)

CONFIRMATION (in law). [DEED.]

CONFUCIUS. The real name of Confucius was Koongfoo-tse: the Jesuit missionaries gave it the latinized form in which we use it. According to some authorities, he lived five centuries and a half, and, according to others, only four centuries and a half, before the Christian æra. There is a difference of opinion as to the place of his birth, but that honour is now generally given to the state of Loo, within the district now called Keo-fow Hien, a little to the eastward of the great canal in Shan-tung province, where he was educated, and where he married in the nineteenth year of his age. He was the only son of a woman of illustrious birth. His father, who had several other sons by another wife, held a high government office, but dying some three years after his birth, seems to have left the future philosopher very indifferently provided for. Marvellous stories are told of his love of study when a child, and of his early proficiency in learning and philosophy. The Chinese also record a little fact that may interest phrenologists, namely, that Confucius's head was remarkable for the elevation of its crown. His object in acquiring knowledge was to turn it practically to the purposes of good government, and he accordingly devoted himself exclusively to moral and political science. He divorced his wife after she had borne him a son, 'in order,' say the Jesuits, who excuse this part of his conduct, 'that he might attend to his studies with greater application.' When he thought himself sufficiently qualified to instruct the barbarous age in which he lived, he quitted his solitude for the courts of princes. China was not then united under one emperor: this union did not take place until two or three centuries after the philosopher's death. But when Confucius began his mission, there seem to have been as many independent kings in China as there were in England under the Saxon heptarchy. From the vast extent of the country, each of these states or kingdoms was probably as large as all England put together. The Chinese were not then more pacific than the rest of mankind: the neighbouring states made war upon each

other, and every part of the Celestial Empire was in its turn deluged with blood. Not long before the birth of Confucius, the horrors of internal warfare had been augmented by some of the belligerents calling in the foreign aid of the Tartars; but when the philosopher commenced his travels, a powerful international confederacy had been formed, under which the whole of China was comparatively tranquil. He journeyed through those various states in a condition of simplicity and poverty, devoting himself to the instruction of all ranks in his precepts of virtue and social order. His proselytes gradually increased, and he at length reckoned as many as 3000 disciples, of whom 72 were more particularly distinguished by their devotion to their master, and 10 were so well grounded in all sorts of knowledge that they were called, by way of excellence, 'the ten wise men.' In his visits to the different princes he endeavoured to prevail upon them to establish a wise and peaceful administration. His wisdom, his birth, his popularity, recommended him to the patronage of the kings, but his laudable designs were frequently thwarted by envy and interest. After many wanderings and disappointments, he became prime minister, with a recognized authority to carry his theories into practice in his native country Loo. At this time he was 55 years old. In three years he is said to have effected a thorough change in the moral condition of the kingdom. The happiness and prosperity created by the philosophic prime minister excited the jealousy of the neighbouring kings; the sovereign of Loo was soon induced to abandon his benefactor, and Confucius was obliged to flee to the northern parts of China. He was subsequently repulsed at three different courts, to which he applied for office in order that he might render the people happy; and, after sustaining many other sorrows, he withdrew to the kingdom of Chin, where he lived in great poverty. His doctrines, however, had taken root, and it was at this time of adversity that his disciples were most numerous. He went again to Loo, his native country, but vainly solicited to be re-employed in the government.

According to some authorities he enjoyed a few glimpses of royal favour in his latter days, being sought after by the rulers of several states, and employed in high offices, which matured his knowledge and experience: but it seems more certain that his rigid principles, and the firm uncompromising manner in which he carried them into practice, always made him many enemies. His zeal endangered his life more than once, but he regarded death with a stoical eye. At length, full of years, if not of honours, he retired from the world, in company with a few of his chosen disciples, to write or complete those works which became the sacred books of the Chinese, and which have survived twenty-two centuries. He died in his seventy-third year. His sepulchre was raised on the banks of the Soo river, and many of his disciples, repairing to the spot, deplored the loss of their great master. The envy and hatred of his contemporaries soon passed away. When peace was restored, and the empire amalgamated, his writings, which had largely contributed to that happy issue, were looked upon as of paramount authority in all matters; and to mutilate, or in any way to alter their sense, was held to be a crime deserving of condign punishment. Unfortunately, however, the obscurity of the language, and the difficult involved nature of the written character of the Chinese, rendered involuntary alterations and mistakes of the sense numerous and inevitable.

Though Confucius was left to end his life in obscurity, the greatest honours and privileges were heaped upon his descendants, who have existed through sixty-seven or sixty-eight generations, and may be called the only hereditary nobility in China. They flourish in the very district where their great ancestor was born; and in all the revolutions that have occurred their privileges have been respected. In the earlier part of the eighteenth century, under the great emperor Kang-hy, the total number of descendants amounted to eleven thousand males. In every city, down to those of the third rank, styled Hien, there is a temple, dedicated to Confucius. The mandarins, all the learned of the land, the emperor himself, are bound to do him service. This service consists in burning scented gums, frankincense, tapers of sandal-wood, &c., and in placing fruit, wine, flowers, and other agreeable objects before a plain tablet, on which is inscribed,—'O Confucius, our revered master, let thy spiritual part descend and be pleased with this our respect, which we now humbly offer to thee.' The ceremony is precisely the same as that which every man is enjoined to observe in the hall of ancestors to his parents, &c.

'It was the great object of Confucius,' says a recent writer, 'to regulate the manners of the people. He thought outward decorum the true emblem of excellence of heart: he therefore digested all the various ceremonies into one general code of rites, which was called Le-ke, or Ly-king, &c. In this work every ritual in all the relations of human life is strictly regulated, so that a true Chinese is a perfect automaton, put in motion by the regulations of the Ly-king. Some of the rites are most excellent: the duties towards parents, the respect due to superiors, the decorum in the behaviour of common life, &c., speak highly in favour of Confucius; but his substituting ceremony for simplicity and true politeness is unpardonable. The Ly-king contains many excellent maxims, and inculcates morality, but it has come to us in a mutilated state, with many interpolations.' (Gutzlaff, *Sketch of Chinese History, antient and modern.*)

In the writings of Confucius the duties of husbands towards their wives were slightly dwelt upon. On the other hand, the duties and implicit submission of children to their parents were extended to the utmost, and most rigidly inculcated. Upon this wide principle of filial obedience the whole of his system, moral and political, is founded. A family is the prototype of his nation; and, instead of the notions of independence and equality among men, he enforces the principles of dependence and subordination—as of children to parents, the younger to the elder. (Dr. Morrison.) By an easy fiction, the emperor stands as the father of all his subjects, and is thus entitled to their passive obedience; and, as Dr. Morrison observes, it is *probably* (he might say *certainly*) this feature of his doctrines which has made Confucius such a favourite with all the *governments* of China, whether of native or Tartar origin, for so many centuries. At the same time it should be observed that this fundamental doctrine has rendered the Chinese *people* slavish, deceitful, and pusillanimous, and has fostered the growth of a national character that cannot be redeemed by gentleness of deportment and orderliness of conduct.

Confucius was a teacher of morals, but not the founder of a religion. His doctrines constitute rather a system of philosophy in the department of morals and politics than any particular religious faith. (Davis.) Arnauld and other writers have broadly asserted that he did not recognise the existence of a God. (Bayle, *Philos. Dict.*, in art. 'Maldonat'). In his physics Confucius maintains, that 'out of nothing there cannot possibly be produced anything; that material bodies must have existed from all eternity; that the cause (*lee*, reason) or principle of things must have had a co-existence with the things themselves; that, therefore, this cause is also eternal, infinite, indestructible, without limits, omnipotent, and omnipresent: that the central point of influence (*strength*) whence this cause principally acts, is the blue firmament (*Tien*), whence its emanations spread over the whole universe; that it is, therefore, the supreme duty of the prince, in the name of his subjects, to present offerings to *Tien*, and particularly at the equinoxes; the one for obtaining a propitious seed-time, and the other a plentiful harvest.' He taught his disciples that the human body is composed of two principles,—the one light, invisible, and ascending; the other gross, palpable, and descending: that on the separation of these two principles the light and spiritual part ascends into the air, whilst the heavy and corporeal part sinks into the earth. The word *death* never enters into his philosophy; nor, on common occasions, is it employed by the Chinese. (Barrow.) When a person dies they say, 'he has returned to his family.' The body, it was difficult to deny, resolved itself into its primitive elements; and became a part of the universe; but, according to Confucius, the spirits of the good were permitted to visit their antient habitations on earth, or such ancestral halls or other places as might be appointed by their children and descendants, upon whom, while they received their homage, they (the dead) had the power of conferring benefactions. Hence arose the indispensable duty of performing sacred rites in the hall or temple of ancestors; and all such as neglected this duty would be punished, after death, by their spiritual part being deprived of the privilege of visiting the hall of ancestors, and of the supreme bliss arising from the homage bestowed by descendants. A belief in good and evil genii, and of tutelar spirits presiding over families, houses, towns, and other places, inevitably arose out of this system. It does not

appear however that either Confucius or any of his followers attached the idea of a *personal being or form* to the Deity; nor have the true Confucians ever represented the *Great First Cause* under any image or personification whatsoever. The images and idols of China belong to other faiths. It was soon found that the notions of Confucius were too abstract and ideal for the mass of his countrymen; who, like the rest of mankind in nearly all ages and all countries, required something material to fix their attention and excite their devotion.

The moral doctrines of Confucius include that capital one, which, however neglected in practice, has obtained, in theory, the universal assent of mankind: he taught his disciples 'to treat others according to the treatment which they themselves would desire at their hands.' In his doctrines there is an evident leaning to predestination or fatalism, and to fortune-telling, or predicting events by the mystical lines of Fo-shee. With all his defects and omissions, Confucius was, however, a most wonderful man. His system, without making any pretension to a divine legation, still continues to prevail throughout the most extensive empire in the world. Some religions may have lasted as long, or longer, but we believe no philosophic code can claim anything like such a lengthened period of active practical existence. The Tibetan, the Budhist, and other religions, have divided and still divide influence with it, but have never overthrown its empire. The superstitious and the vulgar of all classes, from the emperor on the throne to the poor sailor on board the junk, may burn gilt paper and offer sacrifices to wooden idols, practise incantations, and offer up prayers to the 'invisible mother of heaven,' but at the same time they all revere the name of Confucius, and the more enlightened pretend to be wholly guided by his merely philosophical code. The body of his laws and instructions is still followed, not only by the Chinese, but by Coreans, Cochin-Chinese, and other people who, taken collectively, are estimated at 400,000,000 of souls.

The classical or sacred works written and compiled by Confucius and his disciples, are nine in number; that is to say, the 'Four Books' and the 'Five Canonical Books.' The first of the Four Books is the *Ta-heo*, or 'The School of Adults;' the second the *Choong-yoong*, or 'Infallible Medium;' the third the *Lun-yu*, consisting of the conversations and sayings of Confucius, recorded by his disciples, and which, according to Mr. Davis, is 'in all respects a complete Chinese *Boswell*;' and the fourth the *Meng-tse*, which contains the additions and commentary of *Meng-tse*, or Mencius, as he is called by Europeans, who lived about a century after Confucius. The Five Canonical Books, all said to be written or compiled by Confucius himself, are, the *Shy-king*, or Book of Sacred Songs; the *Shoo-king*, which is a history of the deliberations between the antient sovereigns of China; the *Ly-king*, or Book of Rites and Ceremonies, which is considered as the foundation of the present state of Chinese manners, and one of the causes of their uniform unchangeableness; and lastly, the *Chun-tsieu*, which is a history of the philosopher's own times, and of those which immediately preceded him. (J. F. Davis—*The Chinese; a General Description of China and its Inhabitants*, London, 1836; Gutzlaff—*Sketch of Chinese History, antient and modern; Travels of the Jesuit Missionaries*, Bell (of Antermony), Barrow, Staunton, &c.)

CONGE' D'ESLIRE, a term in Norman French, literally signifying 'leave to elect,' which is appropriated to the king's writ or license to a dean and chapter to elect a bishop, at the time of the vacancy of the see. The right of nominating to bishoprics was in most countries of Europe enjoyed by the temporal sovereigns, with little opposition from the ecclesiastical authorities, until the eleventh century, when a contest began between the popes and the monarchs of Europe, which, in the next century, ended in the latter being compelled to surrender this important privilege to the clergy. Father Paul (*Treatise of Benefices*, c. 24), says that between A. D. 1122 and A. D. 1145, it became a rule almost everywhere established, that bishops should be chosen by the chapter. In England, by the constitutions of Clarendon, A. D. 1164, the election was vested in the chapters subject to the king's approbation of the object of their choice. The right of election was afterwards formally surrendered to the chapters by a charter of King John, by which however he reserved to himself, among other things, the right of granting a congé d'eslire, and of confirming the choice of the chapter. This grant of freedom of election was expressly recognised in Magna Charta, and also by a subsequent statute, 25 Ed. III., stat. 6, which was passed for the purpose of preventing the popes from interfering with the elections to dignities and benefices in England.

So the law stood until the passing of 25 Henry VIII., c. 20, which, though repealed in Edward the VI.th's reign, was afterwards revived, and by which episcopal elections are regulated at the present day. By this Act it is provided that upon every avoidance of an archbishopric or bishopric the king may grant to the dean and chapter a license under the great seal to proceed to the election of a successor, and with the license a letter missive containing the name of the person whom they are to elect. If the dean and chapter delay their election above twelve days after receiving the license, the king may, by letters patent, nominate any person whom he pleases to the vacant see; if they delay the election beyond twenty days, or elect any other person than the candidate recommended by the king, or do anything else in contravention of the Act, they incur the penalties of a præmunire. Bishoprics in Ireland are donative by letters patent, without a congé d'eslire. (*Irish Stat.*, 2 Eliz., c. 4.)

CONGER. [MURÆNIDÆ.]

CONGESTION, a preternatural accumulation of blood in the capillary vessels of the sanguiferous system, attended with disordered function of the organs in which such an accumulation takes place. It has been shown [ARTERY, CAPILLARY, CIRCULATION,] that the main functions of the sanguiferous system are performed by the ultimate divisions of the blood-vessels, called, from their hair-like minuteness, *capillaries*; the office of the main trunks and the larger branches of the blood-vessels being merely to convey to the capillaries the material acted upon by them in the various processes which they perform. In the natural and healthy state of an organ, the arterial capillaries in which the arterial trunks that supply it with arterial blood terminate, receive a certain quantity of blood: retain that blood a given time; and then transmit it with a given impetus into the venous capillaries, which in their turn convey it into the larger venous branches, and these to the heart with a given degree of velocity. Upon this transmission of the blood to and from the organs in a given quantity and a given time, depends the balance of the circulation; upon the due balance of the circulation depends the healthy condition of the organic processes; and upon the healthy condition of the organic processes depends the sound performance of the animal functions.

Of the mode in which the balance of the circulation is disturbed by the preternatural accumulation of blood in the capillary vessels, some conception may be formed by observing the phenomena that take place when a mechanical or chemical irritant is applied to a transparent part of the animal body; and when such a part is brought under the field of the microscope, so that the circulation in the minute vessels can be distinctly seen. In this case, the first phenomenon observable is a quickened circulation in the part, and the consequent determination to it of a greater quantity of blood; next, after a time, the blood-vessels are seen to dilate and to become turgid with blood; and in the third place, the flow of blood through these distended vessels is manifestly retarded; and ultimately, if the irritating cause continue to operate with a certain degree of intensity, the circulation is wholly stopped. The quickened circulation, the first phenomenon that takes place, is occasioned by the action of the contractile power inherent in the coats of the capillary vessels, excited in an inordinate degree by the application of the unusual stimulus. The dilatation of the capillary vessels, the subsequent event, arises from a diminution of the vital power of the coats of the vessels, from the over-excitement produced by the irritating cause

The blood-vessels in this state are commonly said to have lost their tone; to be debilitated or weakened. The consequences of this loss of vital power in the living tissues that form the walls of the blood-vessels, are the engorgement of the vessels, the impeded, retarded, or abolished circulation of blood through them, and the disordered or suspended function of the part affected.

From the preceding statement, a distinct conception may be formed of that morbid condition of the blood-vessels, to

the designation of which the term congestion is commonly applied. How greatly such a condition of the blood-vessels must disturb their natural functions, and consequently how powerful an agent it must be in the production of disease, it is also easy to conceive. But pathologists have hitherto made but slight progress in determining with precision the nature of the morbid changes which take place, either in the blood-vessels themselves, or in the tissues in which, as a consequence of this affection, an alteration of structure is sometimes ultimately superinduced.

From an observation of the phenomena connected with the state of congestion, it is usually distinguished into passive and active. When there is merely an accumulation of blood in the distended and debilitated capillaries, without any other manifest morbid phenomenon, the state is called simple congestion; and this state of congestion is commonly said to be passive. But when to this accumulation of blood there are superadded certain phenomena which accompany and which characterize another morbid state, namely, inflammation, the congestion is termed active. In active congestion, the blood-vessels themselves are in a state of excitement; the preternatural quantity of blood they contain is determined to them by their own inordinate activity; they are in a condition not of diminished but of exalted vital energy. In passive congestion, on the contrary, the coats of the vessels are destitute of their natural tonic, vital resistance; yield readily to the current of blood which is determined to them, or unable to pass on the current they receive, the blood accumulates in them and distends them. Active congestion, according to this account, however, can be distinguished by no certain and even no appreciable character from inflammation, a state which is always supposed to be different from congestion. It is certain that the state of congestion has a peculiar tendency to pass into the different state of inflammation, and it is this very tendency that renders congestion so dangerous and fatal a malady. But in what the two states differ, we are at present wholly ignorant. When the link that connects these two states with each other shall be supplied, a clear and bright light will be shed over the nature of some of the most important diseases at present involved in profound darkness. The labours of pathologists, conducted as they now are, with a precision and skill never before exemplified, should be sustained and animated by the prospect of the inestimable practical advantages which must result from the success of their investigations.

The tissue of the body in which the state of congestion is most apt to occur, is the cellular, and more especially in the lax and little cohesive condition in which this tissue forms the parenchyma of the different internal organs, as the brain, the lungs, the liver, the spleen, the kidneys, and so on. A congested state of their blood-vessels is also peculiarly apt to occur in the mucous membranes, and more especially in the mucous membranes of the bronchi and air vesicles of the stomach and the alimentary canal, and of the ovaria and uterus. But besides these, other and less yielding structures, as the serous and fibrous membranes, the skin, and even the muscles, may be affected with congestion, after the operation of causes which have exhausted the vital energies of the system in general, or which have diminished the vital cohesion of these structures in particular.

Congestion, when present to any considerable extent, and when continuing for any length of time, disorders the function of the organ in which it takes place. The signs of this disordered function are signs from which it is inferred that congestion is present. If, for example, the blood-vessels of the brain be in a state of congestion, the activity and energy of the cerebral functions will be diminished, indicated by dulness, heaviness, forgetfulness, inaptitude for mental labour, giddiness, lethargy, and so on: and if the congestion be in great intensity, it may produce all the symptoms of coma and even of apoplexy. [COMA and APOPLEXY.] If the blood-vessels of the liver be in a state of congestion, the secretion of bile will be disordered; altered in quality, diminished in quantity, or entirely suppressed. If the blood-vessels of the mucous membrane of the air passages be in a state of congestion, it will occasion uneasiness in the chest, difficulty of breathing, cough, &c.

Congested states of these and other organs are exceedingly apt to occur in the progress of other diseases, more especially in the different types of fever, the character of which they modify, and the severity and danger of which they always greatly increase. There are fevers indeed, and those of the very worst kind, that is, the most intense and the least under the control of any known remedies, in which a high degree of congestion of the blood-vessels of the brain, of the lungs, of the liver, or of the mucous membrane of the intestines, is among the very first appreciable morbid conditions of the system; but in general such a congested state of the blood-vessels is consequent upon preceding morbid conditions of the organs; conditions by which the vital energies of the blood-vessels have been exhausted.

The appearances presented by congested parts after death, vary with their structure and with the degree and duration of the affection. The capillary arteries and veins are turgid with blood; the blood they contain is of a darker colour than natural; hence the colour of the organ, the seat of the congestion, is darker in proportion to the intensity of the affection; it is also commonly more or less swollen, and the cohesion of its tissues is diminished, so that they are more readily torn than when in a healthy condition. In some organs, indeed, as in the liver and the spleen, when the congestion is in an extreme degree, the cohesion of the component tissues is so much lessened that the organs are broken down on the slightest pressure.

Anything may be the cause of congestion which diminishes the vital energy of the capillary vessels; or which changes, beyond a certain limit, the quantity and quality of the blood they contain. If the vital energy of the capillaries be diminished, they cannot maintain the tension necessary to prevent distension of their parietes, and a consequent preternatural accumulation of blood. If the quantity and quality of the blood they contain be altered, their natural stimulus may be so deficient as not to excite, or so excessive as to exhaust them.

There is no morbid state of the system over which human art has so little control as that of congestion when the affection is extensive and severe. When, however, it is seated only in a single organ, and is not very intense, there are remedies which have a powerful tendency to relieve it; but there is scarcely any disease of the body the treatment of which requires to be conducted with so much caution and discrimination. The adoption of a wrong course, or the too vigorous application of a well-chosen remedy, has, in this case, a more than ordinary tendency to turn the balance between life and death, on the side of death. If the congestion be what is termed active, general blood-letting is sometimes indispensable; on the other hand, there are many cases of passive congestion, in which the abstraction of blood from the system in the smallest quantity, would be certain to extinguish life. In cases in which general depletion would be pregnant with danger, local blood-letting is often safe, and when employed with cautious decision, is the most efficient of all remedies. Its effect is sometimes greatly promoted by external local derivatives, as blisters, and by internal remedies which tend at once to stimulate the heart's action and to equalize the circulation, such as what are termed the diffusible stimulants, and diaphoretics. Emetics and purgatives are also auxiliary remedies, in general safe, and often remarkably efficient.

CONGLETON, a market town and borough in the county of Cheshire. It is in the parish of Astbury, in the eastern extremity of the hundred of Northwich, on the Staffordshire border; 42 miles nearly due east from Chester, in a straight line, and 162 N. N. W. from London. It appears to be a place of great antiquity, and is supposed to have been a military station of the Romans. The present town is a mile in length, and contains many of the antient houses of Cheshire, which are constructed entirely of timber frame-work and plaster. It is beautifully situated in a deep and picturesque valley on the banks of the river Dane. At the west end are numerous detached mansions of the opulent manufacturers of the place, surrounded with shrubberies and ornamental gardens. In the antient part, is the guildhall, a commodious brick building, with a piazza for those who attend the market. The general appearance of the town is neat and respectable, and it bears a character for remarkable healthiness. The Macclesfield canal, and the great road from Lichfield and Stafford to Manchester, pass through it. The population in 1831 was 9352, of whom 4474 were males,

and 4878 females. At this time there were 27 families employed in agriculture, and 1644 families employed in the silk manufacture, which of late years has greatly increased. The silk-mills erected on the banks of the river are very extensive. Ormerod, in his history of Cheshire, speaks of twenty-eight in the year 1819, for ribands and other kinds of silk fabric (vol. iii. p. 20). The manufacture of Congleton is almost wholly confined to black silks. In thrown-silks it exceeds the manufacture of Macclesfield, though in fancy-silks, and in the whole amount of business, it is much inferior. It is observed in the 'Report on the Municipal Corporations' (1835), that no new works have been erected since 1825, and that the state of the manufacture is not such as to offer encouragement to any additional speculations. It is added that the silk goods are greatly exposed to depredations; detection being difficult in consequence of the smallness of the bulk in proportion to the value. There is no cotton manufactory within the boundary of the borough, but there are several immediately beyond it. There are also some tanneries and manufactures of leather. This town was formerly celebrated for tagged leather laces, called Congleton points. The borough of Congleton is co-extensive with the township of Congleton, which is one of several constituting the parish of Astbury. It is divided into three wards, with six aldermen and eighteen councillors. The living is a perpetual curacy subordinate to the rectory of Astbury; but though the chapelry extends over an area of 2500 acres, the stipend is only about 140*l.* a year. The dissenting chapels are numerously attended, including one of Catholics. The Methodists and Independents have schools each, with several hundred scholars. There is a free grammar-school, with sixty-eight scholars, who are taught Latin and Greek; also several Sunday-schools, an infant-school, and several endowed charities. The licensed public-houses are very numerous—there are 50, and 52 beer-shops within the space of 300 yards. (*Municipal Corp. Rep.*, p. 2657, part 4.) The market-day is on Saturday; and fairs are held on Thursday before Shrovetide, May 12, July 5, and November 22, for cattle and pedlars' wares. (*Boundary Report; Municipal Corp. Report; Population Report: Report on Charities;* Lysons' *Mag. Brit.*; Ormerod's *Cheshire.*)

CONGLOMERATE, the generic term for coarse sand or rounded fragments of stone, of various kinds, cemented into a mass. It is sometimes called pudding-stone. Conglomerates differ in their nature, and vary in the size of their component parts according to the process by which they have been brought into the form of conglomerate. The mechanical convulsions of the earth, great floods, and other agents, more or less powerful, having carried the primary materials into places favourable to the process, and rubbed off their sharp and angular parts, they are united into solid masses by a posterior formation. Along the base of the Maritime Alps the rivers, with few exceptions, are now forming conglomerate and sand. (Lyell's *Geology*). Near Nice the mud, pebbles, and portions of rock brought down by the torrents form beds of shingle; but the greater part are swept into the deep sea, where they form strata of inclined conglomerate, about 1000 feet in thickness and seven or eight miles in length. Volcanic eruptions also tend to the formation of conglomerate by uniting masses of rock together. Conglomerates, as already observed, to whatever causes owing, are characterized by being manifestly a congeries of fragments of rock, of various sizes, which have undergone the process of attrition, and consequently have been formed by fragments of various rocks that have been carried considerable distances. [BRECCIA.] Many of these conglomerates are sometimes so well compacted as to form a hard rock, capable of receiving a considerable degree of polish, as we observe in two colossal fragments of heads in the British Museum, the faces of which are tolerably smoothed by Egyptian art, while the broken parts exhibit a conglomerate consisting of irregular-sized rounded grains, and masses of quartz and other rocks.

CONGO. This name, in its most extensive application, as explained under the word ANGOLA, comprehends the whole of the region lying along the western coast of Africa, which is more correctly divided into the four kingdoms or districts of Loango, Congo Proper, Angola, and Benguela. In this large and loose sense it extends from Cape Lopez Gonsalvo, in lat. 0° 44′ S., to Cape Negro, in lat. 15° 40′ S. Congo, properly so called, however, at least according to its modern limits, (for it is said to have been more extensive formerly,) does not stretch to the north beyond the river Zaire (otherwise called the Congo), in about lat. 6° S., which separates it from Loango, nor to the south beyond the river Dando, in lat. 8° 20′ S., which separates it from Angola. It is believed to extend a considerable distance into the interior; but we have no distinct information respecting its limits in that direction, and they are probably not very definitely marked. The country immediately to the east of Congo appears to be that of the Giagas, a race of bushmen whose ferocity is much dwelt upon in the old accounts, and seems to be still the terror of their more peaceable neighbours.

The first European who reached Congo was the Portuguese navigator, Diogo Cam, who made his way thither from Elmina, in 1484. Diogo revisited the country in 1489, making his voyage on that occasion from Portugal. The following year another armament arrived from Portugal, under the command of Ruy de Souza. After this the king of Congo, and many of his subjects, made profession of Christianity, and the Portuguese formed considerable establishments in the country. It was in the course of the seventeenth century, however, that the most strenuous endeavours were made in the work of converting the natives. Ample accounts of the proceedings of the Portuguese missionaries, of the opposition and difficulties of various kinds they had to contend with, and of the wonderful success which, notwithstanding, is asserted to have crowned their persevering labours, are given in the Voyage of Michel Angelo di Gattina and Dionisio Carli di Piacenzo, two Capuchin friars, who set out to join the mission in Congo in 1666; and in that of Geronimo Merolla di Sorrento, another Capuchin father, who joined the same mission in 1682. There are French and English translations of both these voyages, which were originally published in Italian; and they are incorporated in Labat's 'Relation Historique de l'Ethiopie Occidentale,' 5 vols., 12mo. Paris, 1732; along with a translation, also from the Italian, of Father Cavazzi de Montecucculo's description of the kingdoms of Congo, Angola, and Matamba. A relation of the earlier attempts to christianize the people of Congo, beginning with the first introduction of Christianity into the country, may be found in an account of Congo and the neighbouring countries, first drawn up in Italian, in 1589, by Filippo Pigafetta, from the journals and verbal information of Duarte Lopez, a Portuguese captain, who had spent about ten years in Congo, and was eventually sent to Madrid and Rome, on a sort of embassy from the king, for priests, missionaries, and warlike assistance against his enemies. Pigafetta's book was early translated into English and Latin.

The earliest English account of Congo is that published by Purchas under the title of 'the Strange Adventures of Andrew Battel, of Leigh, in Essex, sent by the Portuguese prisoner to Angola, in which kingdom and the adjacent regions he lived eighteen years.' Battel, whose relation is very curious, was detained in this part of Africa from 1589 till 1607. An English navigator, of French descent, James Barbot the younger (so called to distinguish him from his father of the same name, also a writer of voyages), made a voyage to Congo in 1688, the journal of which was published along with the voyages of his uncle, John Barbot. There are translations or abstracts of all these early voyages in the 4th and 5th volumes of Prevost's 'Histoire Générale des Voyages.' Some of them are also in Hackluyt and Purchas; and most of them in Churchill, Harris, Osborne, Pinkerton, and the other English collections. In Labat's book, already mentioned, the accounts of several Portuguese voyagers are added to those of the missionaries. The country is also described, from personal acquaintance, in Olfert Dapper's 'Description of Africa,' first published in Dutch, at Amsterdam, in 1670, but of which there is a French translation, fol. Amst., 1686. The Abbé Proyart has collected the most important particulars mentioned in these voyages in his 'Histoire de Loango, Cacongo, et autres Royaumes d'Afrique,' 1776, of which there is an English translation in the 16th vol. of Pinkerton's collection, pp. 548—598.

According to the old accounts, the native division of Congo is into the six provinces of Bamba, Sogno (or Sonio), Sondi, Pungo, Batta, and Penda. The Portuguese however appear to have divided the country into what they called the metropolitan province of San Salvador, the duchy of Bamba, the duchy of Sondi, the marquisate of Pemba, and

the county (or earldom) of Sogno, thus omitting altogether Pango and Batta, or comprehending them under some of the other names. The Portuguese province of San Salvador is a part of the native province of Pemba, the marquisate of Pemba being the remainder. It is placed along a portion of the left bank of the river Congo, immediately to the north-east of Sogno, which occupies the angle formed by the river and the sea-coast. In this province is the capital, said to have been antiently called Banza, which appears however to be merely a name signifying a chief town, the residence of a king, or even of a subordinate ruler. The Portuguese having established a settlement here, gave the place the name of San Salvador. It is described as situated about 150 miles from the sea, and about a third of that distance from the river, in a hollow on the south-east side of a lofty mountain, having on the summit a plain of about ten miles in circuit, which is covered with towns and villages. The palace of the native sovereign and the Portuguese part of the town are each surrounded by an inclosure of about a mile in circumference; but the suburbs of the Portuguese town are described as also of considerable extent. The principal ornaments of San Salvador were, a cathedral and nine or ten other churches, all built of stone, although, with the exception of that of the Jesuits, roofed only with thatch. The religious establishment consisted of a bishop and chapter, a Jesuit college, a convent of capuchins, &c. It appears however that even before the end of the seventeenth century the ravages of war had almost ruined San Salvador, and the native sovereign had transferred his residence to another place, called Lemba, in the province of Bamba, and nearer the sea-coast.

For details as to the history, the religion, the customs, the arts, and the former general condition of the people of Congo, we must refer the reader to the missionary accounts, in which these matters are treated at great length. There is probably however a good deal of fiction in these accounts, the prevailing aim of which evidently is to exaggerate the importance of the country and its inhabitants. At all events, now that both the show of Christianity and the very thin sprinkling of civilization, of which this region of Africa may at one time have had to boast, have nearly disappeared, these old descriptions would certainly be found very inapplicable to the present state of Congo.

The most authentic information we possess respecting the modern state of Congo, is derived from the 'Narrative of an Expedition (sent out by the English government) to explore the river Zaire, usually called the Congo, in 1816, under the direction of Captain J. K. Tuckey, R. N.,' 4to., London, 1818. Captain Tuckey and his companions, of whom out of 56, the whole number, no fewer than 21 perished in this disastrous expedition, including Tuckey himself, and all the scientific persons whom he took along with him, made their way up the river to a point about 280 miles from its mouth; and in the course of their navigation they both saw and conversed with many of the natives, and made some excursions a short way into the interior of Congo. Their actual inspection of the country however was of course confined to the portion along the bank of the river; and the only record we have of the information they obtained, consists of the journals of Captain Tuckey and Professor Smith, the botanist attached to the expedition, hastily drawn up at the time, and which the writers had no opportunity of revising and extending at leisure. Their account therefore can scarcely be safely assumed as applicable to more than a very small part of the whole region comprehended under the name of Congo. It is, in fact, principally an account of the lower part of the great river up which the expedition sailed.

The Congo, even till of late years, was supposed by some persons to be the embouchure of the Niger; but long before this point was settled, the soundest geographers were of a different opinion, although Captain Tuckey's expedition was undertaken with the view of ascertaining the matter; and in the official account of the voyage, the identity of the two rivers is elaborately contended for by a writer, who declares that 'the hypothesis which makes the Niger to pour its waters into the gulf of Benin is entitled to very little attention.' The Congo is not properly called the Zaire, it seems, as Diogo Cam was led to suppose, that being merely a word signifying any great river, but the Moienzi Enzaddi, which means the river that swallows up all other rivers. The old accounts represent the velocity with which it rushes into the sea to be so great, that it preserves its stream unaffected by the salt water for twenty leagues or more. This description Captain Tuckey found reason to believe considerably exaggerated. It had been usually stated that the Congo was always full of water; but when he entered it, in the beginning of July, he found it from eight to eleven feet lower than the point which from the marks on the rocky banks it appeared to have reached at other seasons. The tide also was very perceptible at 140 miles up the river. The velocity of the current at the mouth of the river was found nowhere to exceed 4½ or 5 knots an hour, and in many places it was not more than 2½. The accounts of some preceding navigators make it flow at the rate of six or seven knots; and so it very possibly may do, when the channel is more full of water. The depth however in the middle of the stream here was very great, no bottom having been found with a line of 160 fathoms; so that when the river is at high flood the mass of water which it pours forth must be immense. Its breadth for some distance from the sea is not less than five or six miles; it is then divided by a number of islands into several streams: at the distance of 140 miles from the mouth the Narrows commence, and continue for about 40 miles, during which it forces its way between two opposite barriers of steep rocks, not more than from 300 to 500 yards asunder. Many ledges of rocks stretch across this part of the river, the most formidable of which however, called the Great Yellala, or Cataract, has only a fall of about 30 feet in 300 yards, and would be more appropriately designated by the term Rapid. Above the Narrows, which terminate at a place called Inga, the river expands to the breadth of two, three, and even four miles. Tuckey ascended it for about 100 miles beyond this point, and he was assured by the natives that after this there was no impediment to its continued navigation for a great distance. Its direction, according to their account, continued to be nearly in a straight line towards the north-east; and Tuckey appears to have felt convinced that it must have its source in some vast lake or chain of lakes several degrees to the north of the equator. Much surprise was experienced at finding that it did not receive the water of any other stream in the whole distance along which the survey extended; and both Captain Tuckey and Professor Smith were inclined to believe that it must receive accessions of water by some underground communication. The old delineations of the river, it is to be observed, also represent it as without any tributaries in this part of its course; but they make numerous rivers to flow into it higher up. The torrents that pour down in the rainy season however through the ravines between the hills on both sides of it, probably bring it a considerable supply. In the lower part of its course the Congo spreads out into extensive swamps, which are covered with mangrove and palm trees, as are also the islets by which it is here interrupted; above the swampy region, hills, none of which much exceed 2000 feet, rise all the way that the survey extended at a short distance from the channel, or the rocks between which it is confined. Up to the great cataract of Yellala these hills are stony and nearly barren, and the rocks at the Narrows are composed of masses of micaceous slate; but beyond this point the rocks are of limestone, and the country is described as fertile and beautiful. Even below this however, between the hills and the water, vegetation is in many parts very luxuriant, and numerous villages are to be seen both in the hollows and even on the flat summits of the mountains. The old maps make five or six smaller rivers fall into the sea between the Congo and the Dando.

With regard to the products of Congo, the information acquired by this expedition accords sufficiently with the accounts of the Portuguese missionaries. Although so many of the members of the expedition were cut off by a fever, which appears to have been brought on by fatigue and exposure to the night air, and to have been of a contagious character, the climate of Congo is described as neither disagreeable nor in ordinary circumstances unhealthy. The range of the thermometer in a period of a month, from about the middle of July to the middle of August, was never below 60° during the night, nor above 80° during the day; the common noon-day heat was 76°. Among the vegetable products (for many of which the natives must have been indebted to the Portuguese) are manioc or cassava, yams, maize, sweet potatoes, pumpkins, millet, calavanses, cabbages, spinach, pepper, capsicum, the sugar-cane,

and tobacco. Of fruits, they have the banana, the papaw, the orange, the lime, and the pine-apple, which last Captain Tuckey found growing in the open places at the extreme point to which he penetrated. If, as is supposed, the pine-apple be indigenous only in the New World, the plants must have been carried thither by the natives, for certainly no European settlements had ever been formed so far from the sea-coast. Their only prepared beverage is a wine made from the juice of the palm-tree, which was found by the members of the expedition to be both an agreeable and a wholesome drink. Of domestic animals there are goats, hogs, fowls, ducks, and pigeons, as well as a few hairy sheep. There were also some horned cattle, to which however little attention seemed to be paid; no beasts of burthen were seen. Of wild animals, the country abounds with elephants, leopards, lions, buffaloes, large monkeys, antelopes, wild hogs, &c. Guinea fowl and red-legged partridges are described as abundant, large, and fine, and wild pigeons, of three or four species, as very plentiful. Bees are in great numbers; the flea and the bug were the only insects that were found troublesome. The lower part of the river abounds in different species of fish, which form an important part of the subsistence of the people; it also, especially above the Narrows, swarms with hippopotami and crocodiles.

The native sovereign of Congo, Captain Tuckey was informed, was called Lindy, or Blindy N'Congo, and resided at a place called Banza Congo, six days' journey southward from the river. This is, in all probability, the San Salvador of the Portuguese, who were affirmed by the natives to have soldiers and white women there. Under the king are the Chenoos. 'The Chenooships,' says Captain Tuckey, 'improperly named kingdoms by Europeans, are hereditary fiefs, passing in the female line, that is, on the decease of the Chenoo the succession, instead of passing to his son, goes to his brother, or uterine uncle or cousin.' In other words, to secure the certainty of the blood royal, the successor must descend from the same female ancestor with the deceased chief, and must be the nearest male descended, either immediately or through a line of females, from that common female ancestor. Of the inferior officers, the chief is the Mafook, or collector of the customs, who is generally qualified to act as an interpreter to the European visitors of the coast. These functionaries also often amass considerable wealth by giving their services as agents to the slave traders, Portuguese and piratical, who still resort to Congo. A place called Embomma, on the north bank of the river, and about fifty miles from its mouth, appears to be the great slave mart. It may be observed that Captain Tuckey represents the dominions of Congo as comprehending a small territory to the north of the river included within a line drawn from below Malembo, a town on the sea coast about fifty miles north from the mouth of the river, to Banza N'Inga at the termination of the Narrows.

The natives of Congo, although they have thus an established government, and have arrived at the agricultural state, cultivating regularly two crops of Indian corn in the year, must be considered as sunk in the same barbarism with the other nations of the west coast of Africa. Rights of property are well understood among them, and are carried so far that a fowl or a pig will sometimes have three or four proprietors. But their houses are mere huts constructed of a few posts stuck in the ground and interwoven with reeds, and they go naked, with the exception of a small apron, generally of grass-matting, tied round their loins. They seem to be a timid and unwarlike race, and both their indolence, and their sensuality are extreme. Their women are their drudges in all kinds of laborious work, and, not excepting the sisters, daughters, and wives of the highest personages, are eagerly offered by them for a trifle to a white man of any grade. Their sense of the whites being a race of beings altogether distinct from themselves seems to be complete. They scarcely appear to have gained a step towards civilization by their intercourse with the Portuguese. Even the Christianity introduced among them by their European conquerors has, as in such circumstances might be expected, retained very little resemblance to what is commonly understood by that name. Captain Tuckey was visited, when near the coast, by a Christian priest, who had been taught to write his own name and that of Saint Antonio, and could even read the Romish litany in Latin, but who boasted that he had a wife and five concubines, and stoutly maintained that this kind of polygamy was not at all prohibited in the New Testament. Both this man and the other Christians, as they called themselves, who came along with him, were tattooed all over like the rest of the natives, and had the two upper front teeth filed away, in deference to the prevalent notion of beauty in Congo.

It is a curious circumstance that the language of Congo, which is merely a dialect of that of Angola, Benguela, and the other neighbouring districts, appears to be also radically the same with that spoken by the natives of the east coast of Africa, which is separated by thirty degrees of longitude from the coast of Congo. This fact was first noticed by the late Mr. Marsden (the author of the 'History of Sumatra,'), and has been confirmed by the lists of Congo words collected by Captain Tuckey.

Since the publication of Captain Tuckey's Voyage, an account of a visit to Congo and the neighbouring countries, by M. Douville, has appeared in the transactions of the French Geographical Society. This voyage, unfortunately for those who profess to be geographers and have given credit to it, turns out to be the fiction of an ignorant and unprincipled adventurer. Douville afterwards published a separate book, with plates. The plates on the face of them are good for nothing.

CONGREGATION most commonly signifies an assembly of persons for the purpose of public worship and religious edification. It denotes more particularly a number of ecclesiastics constituting a legislative and executive body; and in this acceptation it is applied chiefly to certain Boards of administration consisting of cardinals and of prelates, or aspirants to the cardinalship in Rome. These congregations serve as a check on the papal authority: for though their proceedings are usually sanctioned by the pope, he cannot, without alleging the weightiest reasons, put a veto on them. The whole number of these congregations is twenty-one that is, fifteen for spiritual and six for temporal purposes. Congregation is also used to designate a company, society, or fraternity of monks forming a subdivision of an order, as the congregation of the Oratory, or of Cluny among the Benedictines. The congregation of the Lord' was an appellation assumed by the Scotch Presbyterian Reformers, who called the church of England the congregation of Satan. They appeared first in 1557, under the earl of Argyle, and were subsequently led by John Knox.

Congregationalists are those who compose the congregations which assume an independence not only of the ecclesiastical control of the established hierarchy, but of all authority extraneous to the constituency of the congregation itself. They may therefore in general be said to be identical with the Independents. They are said by some to have appeared first in 1616, under the conduct of Mr. Jacob. (Evans's '*View*.') But they are generally considered to be of the same origin as the Brownists, who appeared in 1600. [BROWNISTS.] The real founding of the sect is attributed to Mr. Robinson, in 1640, and the following passage from his 'Apology,' c. 5., p. 22, is adduced as their leading maxim. 'Cœtum quemlibet particularem esse totam, integram et perfectam ecclesiam, ex suis partibus constantem immediatè et independenter sub ipso Christo.' It is said that they adopted the name of congregational brethren, and congregational churches, to avoid the odium of sedition and anarchy which was charged upon them as the Puritan regicides of Charles I. Cromwell made use of them as a political check on the Presbyterian party. (See 'Declaration of the Faith and Order owned and practised by the Congregational Churches in England,' 1658.) In the six New England States of North America, which were colonized by the English Puritans, the Congregationalists are very numerous; and in several other parts of the union their numbers are much larger than those of other sects. Their creed and the rules of their democratic government are given fully in their 'Platforms of Discipline.' They believe in 'The Trinity; Predestination; Total Depravity; Particular Redemption; Effectual Grace and Final Perseverance;' and maintain that 'Every congregation of visible saints, furnished with a pastor, is under no other ecclesiastical jurisdiction whatever.' (Mosheim, vol. v., p. 398; Neal's *Hist. Puritans*, vol. ii., p. 107; vol. iii., p. 547; vol. iv., p. 187; Burnet's *Hist. Own Times*, vol. i., p. 16; Adam's *Dict. of Religion*; *Reasons against the Indepen. Gov. of Congregations.*)

CONGRESS, AMERICAN. [UNITED STATES OF N. AMERICA.]

CONGREVE, WILLIAM, was the second son of Richard Congreve of Congreve in Staffordshire, and born at Bardsa, near Leeds, in Yorkshire. His father, who held a commission in the army, took him over to Ireland at an early age, and placed him first at the Great School at Kilkenny, and afterwards under the direction of Dr. St. George Ashe, in the University of Dublin. After the revolution in 1688 he returned to England, and was entered as a student in the Temple. His first play, written at the age of nineteen, was the 'Old Bachelor,' which was produced with great applause at Drury-Lane in 1693; and Dryden is said to have remarked that he had never seen such a first play. The next year he produced 'The Double-Dealer,' and in 1695, joining with Betterton, they commenced their campaign at the new house in Lincoln's Inn Fields with a new comedy written by Congreve, called 'Love for Love.' In 1697 he produced his tragedy of 'The Mourning Bride,' and two years afterwards the comedy of 'The Way of the World.' The indifferent success of this last play disgusted him with the theatre, and he determined to write no more for the stage. Through the friendship of his patron the Earl of Halifax, he was first made one of the commissioners for licensing hackney-coaches, then presented with a place in the Pipe Office, and after that with one in the Customs, worth 600*l.* per annum. On the 14th of November, 1714, he was appointed commissioner of wine licences, and on the 17th of December, in the same year, nominated secretary of Jamaica. The last twenty years of his life were spent in retirement, and towards its close he was much afflicted with the gout and with blindness. Being overturned in his chariot on a journey to Bath, he received, it is supposed, some internal injury, and, gradually declining in health, died on the 19th of January, 1729, at his house in Surrey Street in the Strand, London, aged 57, and was buried on the 26th of January, in Westminster Abbey. Mr. Congreve was also the author of a romance called 'The Incognita, or Love and Duty reconciled,' written at the age of seventeen; 'The Judgment of Paris,' a masque; 'Semele,' an opera, and several poems. His merit as an *original* writer Johnson pronounces to be of the highest kind, as he 'borrowed neither the models of plot, nor the manner of his dialogue.' Of his plays, he remarks, that his characters are commonly fictitious and artificial, with very little of nature, and not much of life. His scenes exhibit not much of humour or passion; his personages are a kind of intellectual gladiators—every sentence is to ward or strike; the contest of smartness is never intermitted; his wit is a meteor, playing to and fro with alternate coruscations. 'His comedies, therefore,' observes the critic, 'have in some degree the operation of tragedies—they surprise rather than divert, and raise admiration oftener than merriment.' His only tragedy, 'The Mourning Bride,' although very successful, is a piece of unrelieved bombast. 'Love for Love' is the only play of Congreve's which has still possession of the stage, and even that is rarely acted, as its wit cannot atone for the exceeding grossness of much of the dialogue.

CO'NI, or more generally CU'NEO, a province and town of the Sardinian states in the south-west part of Piedmont, near the foot of the Maritime Alps, which divide it from the county of Nice and from France. The province of Cuneo is bounded on the north by the province of Saluzzo, east by that of Mondovi, south by that of Nizza, and west by the French department of Basses Alpes. It is a country of valleys, which slope down towards the great valley of the Po, and in which the Grana and the Macra, affluents of the Upper Po, the Stura and its affluents, and several of the affluents of the Tanaro have their source. The valleys, which are naturally fertile, are improved by the excellent system of irrigation. The principal products are corn, wine, hemp, hay, and silk. The south and west borders of the province lie among the Alps, the lower slopes of which are covered with chestnut trees, and the upper parts afford summer pasture. The length of the province west to east from the sources of the Stura to the borders of the province of Mondovi near Chiusa, is about forty miles, and its greatest breadth from north to south from Fossano to the Col di Tenda, is about thirty miles. The population is reckoned at 143,000. (Serristori, *Saggio Statistico.*) The province contains several considerable towns: 1. Cuneo, the capital, and a bishop's see, has a royal college, and 18,000 inhabitants, and is the residence of the intendente and of the military governor. It was formerly a place of great strength, and sustained several sieges; but its fortifications were razed in 1801. A navigable canal runs from Cuneo to Carmagnola, uniting the Stura with the Po. The high road from Nizza to Turin by the Col di Tenda passes through Cuneo. 2. Fossano, with 12,500 inhabitants, and a bishop's see, situated in a fine plain near the Stura, has a royal college, and a college for boarders, kept by the Fathers Somaschi. 3. Demonte, in the valley of the Upper Stura, on the road leading to the Col de l'Argentiere, has 6400 inhabitants, and a grammar-school kept by the Scolopi. The mineral baths of Vinadio, a few miles above Demonte, have considerable reputation. 4. Dronero, in the valley of the Macra, has 6700 inhabitants, and a college. 5. Caraglio, 5800 inhabitants, and a college. 6. Busca, on the road from Cuneo to Saluzzo, 8000 inhabitants, and a college likewise. 7. Boves, 7700 inhabitants, and a grammar-school. 8. Chiusa, 5500 inhabitants, and a grammar-school. 9. Centallo, on the road from Cuneo to Turin by Savigliano, has 4400 inhabitants. 10. Limone, at the foot of the Col di Tenda, has 3400 inhabitants, many of whom are employed with their mules in carrying goods and passengers over the mountain. There are besides in the province of Cuneo several other small towns, of between 2000 and 3000 inhabitants. (*Calendario Generale dei Regj Stati*, Torino, 1824.) These valleys were in antient times inhabited by the Vagienni, a tribe of the Ligures. The Roman colony of Pedona is believed to have stood where Borgo San Dalmazzo now is, a few miles south of Cuneo. Augusta Vagiennorum stood farther north, near Fossano. All traces of those colonies became lost in the middle ages, and it is believed that they were destroyed by the Saracens, who from their stronghold of Frassineto near Nizza infested and devastated these valleys in the tenth century of our æra. (Jacopo Durandi, *Delle Antiche Città di Pedona, Caburro, Germanicia, ed Augusta de' Vagienni.*)

CONIA. [CIRRHIPEDA.]

CONIC SECTIONS, the curves formed by the intersection of a circular cone and a plane, the former being either oblique or right.

Though the name of conic sections still remains, yet the interest which attaches to these curves, and the method of treating them, has no longer any reference to the accident from which they derive their name. The Greek geometers, in pure speculation, occupied themselves with the different methods in which a cone may be cut, simply because the conical surface (with the cylindrical and spherical) came within the restrictive definitions under which they had placed geometry. [GEOMETRY.] The works of APOLLONIUS and ARCHIMEDES are the first in which these sections were treated; and their history is nothing but that of the addition of a few remarkable properties, till the discovery that the path of a projected body in an unresisting space is a parabola, and that of a planet round the sun, an ellipse. [GALILEO, KEPLER.] Since that time we might as well attempt to write the history of mathematics and physics as that of conic sections in their results and consequences: and from that time we have nothing to say of them merely as *conic sections.*

Some sections of a cone are considered in elementary geometry, for a plane may meet a cone in a point, or in a single straight line, or in two intersecting straight lines, or in a circle. But the curves which are peculiarly conic sections, are the oval made by a plane which cuts the cone entirely on one side of the vertex, called the ELLIPSE: the indefinitely extended modification of this when the plane becomes parallel to any one slant side of the cone, called the PARABOLA: and the curve which is partly on one side, and partly on the other of the vertex, formed by a plane which cuts both surfaces of the cone, called the HYPERBOLA. To these names we refer for the specific properties of the sections.

Algebraically considered, the *conic sections* are the *curves of the second degree*, meaning the curves belonging to such equations between co-ordinates are of the second degree. Thus x and y being co-ordinates, oblique or rectangular, the general equation

$$ax^2 + bxy + cy^2 + dy + ex + f = 0,$$

may, by properly assuming a, b, c, &c. be made the equation of every possible section of a cone by the plane in which the co-ordinates are measured. As very many elementary works do not fully discuss the conditions under which the preceding equation represents the different sections, we

subjoin the following from the 'Camb. Phil. Trans.', vol. v. p. 89. In the following list θ means the angle made by the co-ordinates. [The notation has reference to the table in SURFACES OF THE SECOND DEGREE.]

$$\text{Let } V_1 = a + c - b\cos\theta \quad V_2 = 4ac - b^2;$$

$$W' = \frac{cd^2 + ae^2 - bde}{b^2 - 4ac} + f,$$

and in the case where V_2 and $cd^2 + ae^2 - bde$, are both $= 0$, let

$$W'' = \frac{4af - d^2}{4a} = \frac{4cf - e^2}{4c}.$$

In the following table, p means either sign, $+$ or $-$, but in the same line, n means the other sign; a dotted line means that the sign of the expression at the head of the column need not be considered. The word line by itself means straight line.

W'	V_2	W''	V_1	Name of the Section.
p	$+$		p	Impossible.
p	$+$		n	Ellipse.
....	$-$		....	Hyperbola.
0	0		....	Parabola.
0	$+$		....	Point.
0	$-$		....	Intersecting lines.
$0 \div 0$	0	p	p	Impossible.
$0 \div 0$	0	p	n	Parallel lines.
$0 \div 0$	0	0	....	Line.
$0 \div 0$	0	∞	....	Line.

Thus if W' and V_1 both have the same sign, and V_2 be positive, the equation cannot be satisfied at all; but if W' and V_1 be of different signs, and if V_2 be positive, the equation is that of an ellipse. We may add that $V_1 = 0$, indicates an equilateral hyperbola. [HYPERBOLA.]

The general properties of the sections are numerous and interesting, but we shall only mention one, because it is the most convenient as a general definition of the curves, combining them at once with each other, in a manner to which algebra is easily applied. If a point move in such a way that its distance from a given point (called the *focus*) always is the same fraction of its perpendicular distance from a given right line (called the *directrix*), then the curve traced out is an ellipse, parabola, or hyperbola, according as the given fraction is less than, equal to, or greater than, unity. We are convinced that no method of deducing the properties of these curves can be very successfully applied in the case of beginners, unless it involve the foci in the definition. The properties of these points do not readily show themselves either in the deduction from the cone, or from the general algebraic equation.

CONICAL PROJECTION. A method of describing a representation of a part of sphere upon a plane. A sphere cannot be unrolled into a plane, as can every cone or portion of a cone. If a cone be described which touches a sphere in a small circle, and if the several points of the sphere be then projected upon the cone by lines drawn through the centre, the parts adjacent to the small circle of contact will be projected into figures very nearly similar to the originals. If the degrees of latitude, which are very nearly equal, be made actually equal, no injurious effect will be produced on the map. Suppose, for instance, it is required to draw the map of a country contained between two given longitude circles, and two given parallels of latitude.

Take any radius for the sphere, and let S A be the radius × cotangent of the middle latitude of the map. From A set off A B, A C, &c., equal to the arc of one degree (or whatever the distance may be between the parallels which it is desired to draw) on the great circle of the sphere chosen. Let L° be half the total longitude contained between the extremities of the map, and take the angles A S P and A S O, equal to L° × the sine of the middle latitude. Divide the angle Q S P into as many parts as there are degrees (or other required intervals of longitude lines) in L: then Q R T P is the map required, and V X Y Z such a portion as is usually exhibited on a sheet of paper.

If instead of the tangent cone, it be required to project upon the cone formed by the revolution of the chord which joins the two extreme points of the map on the sphere, let l and l' be the least and greatest latitudes, and let

$$SR = \text{radius} \times \cos l' \div \sin \tfrac{1}{2}(l + l')$$
$$SQ = \text{radius} \times \cos l \div \sin \tfrac{1}{2}(l + l')$$

the rest is as before.

There are two modifications of this principle which it will be convenient here to notice; the projection used by Flamsteed, and that adopted by the French government in their recent maps. In Flamsteed's projection the degrees of latitude are equal, and the parallels of latitude are perpendicular to the middle longitude circle, which is a vertical right line. But the degrees of longitude are made in every parallel to bear the same proportion to the degree of latitude as on the globe: so that the meridians are, in fact, curves, the ordinates of which are as the cosines of the abscissæ.

In the French government maps, the same plan is adopted, with this exception, that the parallels of latitude are the circles of the conical projection, and the degrees of latitude are all equal (the oblateness of the earth may be allowed for, if thought necessary); the degrees of longitude are then set off on the parallels of latitude in the same proportion as in Flamsteed's projection.

CONI'FERÆ, a natural order of Gymnospermous exogens, consisting of resinous, mostly evergreen, hard leaved trees or shrubs, inhabiting all those parts of the world in which arborescent plants can exist. Under this name are collected the various races of fir trees, pines, cedars, junipers, cypresses, and the like, which, however dissimilar they may at first sight appear, correspond not only in their universally terebintaceous sap, but in the following points of organization:—They all branch from numerous buds, proceeding from the side of a main stem. Their wood consists of tubes of nearly equal diameter, among which are here and there fistular cavities which receive the resin that exudes from the wood. The sides of the woody tubes are marked by circular disks, which, when highly magnified, appear as if consisting of a smaller internal and a large external circle; the nature and use of these disks is unknown. The following cut represents highly-magnified sections of a piece of deal; A shows the nearly equal size of the woody tubes when viewed transversely. B is a perpendicular section with the disks seen on the sides of the tubes.

The leaves are articulated with the stem, and very often are linear, veinless, and sharp-pointed; but in some cases, as Salisburia adiantifolia, *fig.* 1, and Podocarpus asplenii-folia, *fig.* 2, the leaves become broad, and then they are filled with veins, which are all of the same size, and branch by repeatedly forking; a mode of veining known only in

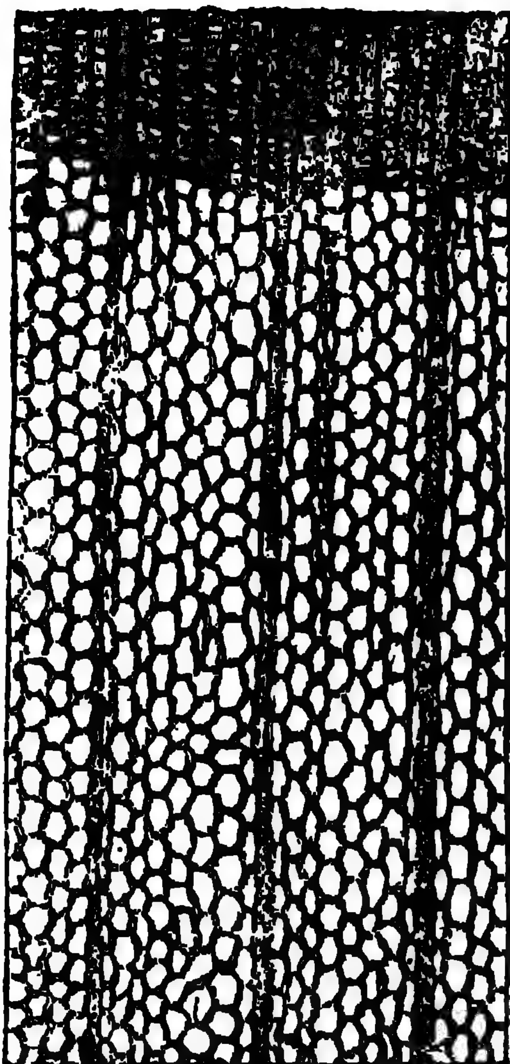

A

Fig. 1.

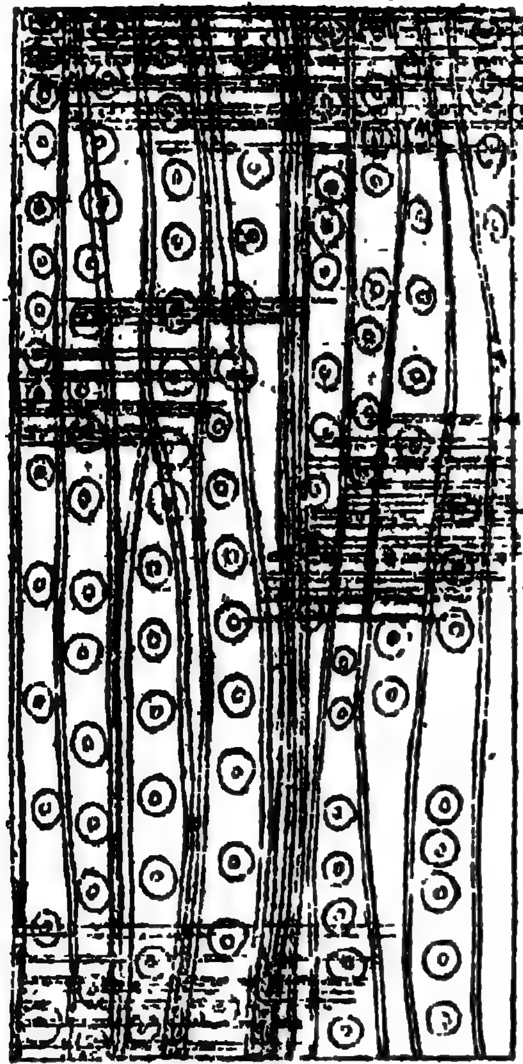

B

Fig. 2.


[Salisburia adiantifolia.] [Podocarpus aspleniifolia.]

those plants and in ferns. The flowers are collected in little scaly cones; males in one cone, and females in another. The females have no pericarpial covering, but consist of naked ovules, to which fertilization is communicated directly from the pollen, without the interposition of a style or stigma. When the fruit is ripe it consists of a certain number of scales collected into a cone, and inclosing the naked seeds in their axils. Sometimes such scales are thin as in the larch, or hard and long as in the pine, or even succulent as in the juniper, whose berries, as they are named, are small cones with succulent consolidated scales.

Coniferæ are among the most useful of all plants, firstly, for their resinous secretions, such as pitch, turpentines of different kinds, Canada balsam, and similar substances; secondly, for their timber, which under the names of deal, fir, pine, red cedar, Sandarach wood, &c., is most extensively used in building; and thirdly, because of the screen which their compact, evergreen leaves oppose against cold, in barren, bleak situations, where few other trees will grow. [ABIES, PINUS, CUPRESSUS, THUJA, JUNIPERUS, ARAUCARIA, &c.]

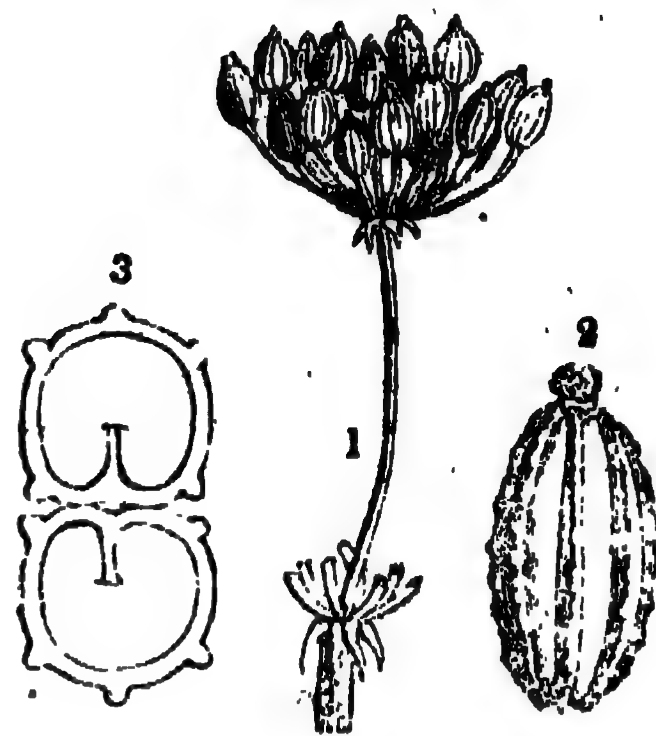
CONILIRA. [ISOPODA.]

CONILITES. [ORTHOCERATA.]

CONIPORA. [POLYPIARIA MEMBRANACEA.]

CONIROSTRES (Zoology), the third family of Cuvier's Passeres, comprising those genera which have a strong bill, more or less conical, and without notches. Cuvier says that they live more or less exclusively upon seeds, in proportion as their bill is more or less thick. The *Conirostres* form one of the five tribes of the order *Insessores* of Mr. Vigors. [BIRDS, vol. iv., p. 431.]

CONI'UM MACULA'TUM, or HEMLOCK, is a wild umbelliferous plant, possessing highly narcotic and dangerous qualities, but used medicinally as a remedy against nervous affections. It has a white, fusiform biennial root; an erect, branched, bright green, spotted stem, from five to ten feet high, on which are planted so many smooth, finely cut, large, fern-like leaves. When very healthy and growing in a spot where it is neither injured by storms nor disfigured by dust, the hemlock is one of the most noble of all wild plants. Its little greenish white flowers, arranged in umbels after the manner of its order, have a minute involucre of several leaves at the base; and the partial umbels have also three or four short oval leaflets on one side. The fruit is globular, each half having five projecting angles which are slightly crenelled, without either vittæ or appendages or projections between them. It grows in wild places, sometimes by the sides of ditches in meadows, but more frequently in light upland pastures, flowering in June and July. It is almost the only wild umbelliferous plant whose fruit is destitute of vittæ, and consequently not aromatic.



[Fruit of Conium maculatum.]

1. A partial umbel loaded with fruit, natural size. 2. The back view of a fruit, much magnified. 3. A transverse section of the same, showing the ridges, the absence of vittæ, and the involute albumen.

It is necessary to pay the greatest attention to the botanical characters of Conium maculatum, in order that the genuine one may be collected. Sometimes plants resembling it are collected, which are almost or entirely inert when employed as a medicine, or plants possessed of greater potency are used in its stead, from which fatal results have followed. It is a 'well-known circumstance that the greatest discrepancy prevails among medical men as to the activity of hemlock, not merely as a remedy but also as a poison.' This discrepancy admits of satisfactory explanation on several grounds. The activity of the plant—even supposing the proper one to be collected—depends greatly upon its place of growth, the kind of season, the time when collected, and the means employed to dry it or form it into an extract, on the temperature and dryness of the place where it is preserved, and on the length of time it has been kept. In the south of Europe it is much more energetic than in the north, owing to the greater intensity of light: even in the southern provinces of France it is more powerful than in the northern. The wild plant, growing in well-exposed situations, is always to be preferred to a cultivated one; the kind of season markedly influences its power, which is greatest in a dry sunny season, and least in a wet gloomy one. The leaves during the first year of growth possess little potency; nor do they possess much during the early period of the second, till the flower-stem is developed, and the flowers are about to expand. If this period, which is the fittest time for collecting the leaves, is allowed to pass, it is better to wait two months longer and collect the fruits instead, as they become the recipient of the active principle. The leaves should be dried quickly, but not by the application of a high temperature; they should never be powdered till the time when it is intended to use them, but preserved meanwhile in a cool dry place. If an extract be formed which requires much care in the preparation, it can rarely be kept beyond twelve months. A fresh supply of leaves, fruits, or extract, should consequently be procured every year, and the former thrown away, as the action of time or heat volatilizes the active principle (Conia), and renders the residue nearly inert. When these precau-

tions are attended to, hemlock is a medicine of great power, and unquestionable value.

The fresh leaves are dark green, shining; odour strong, stupifying, unpleasant, resembling that of mice, or the urinous odour of fresh Spanish flies; when dried the colour is lighter, a greyish green; the taste is disagreeably saline, nauseously bitter, and at last somewhat acrid. The expressed juice is green.

The active principle of hemlock appears to be an alkaloid termed *conia*, which, unlike most vegetable alkaloids previously known, is not fixed and crystalline, but volatile and oleaginous. It has been obtained both from the leaves, and fully developed but still green fruits. Its activity is increased by union with acids, both mineral and vegetable; a circumstance which shows the impropriety of giving vinegar as an antidote in cases of poisoning by hemlock, when any of the substances is yet present in the stomach. Conia is sparingly soluble in water, to which it imparts its odour and taste. It also combines with about a fourth of its weight of water to form a hydrate of conia. When exposed to the air it quickly contracts a dark brown colour, and is slowly resolved into a resinous matter, with the disengagement of ammonia. This change takes place more promptly under the co-operation of heat; but even at common temperatures it is so apt to ensue, that unless the alkaloid be kept very carefully excluded from the air, discolouration will take place in a few hours. Though conia exists in the plant in combination with some acid, which may render it less alterable, yet its proneness to decomposition is so great, that either by time or the application of a considerable degree of heat, it may be entirely dissipated; which accounts for the inertness of old leaves, and of most extracts which have not been prepared with the greatest care. Geiger says that the dried leaves do not contain conia; a statement which, if correct, leads to the conclusion that conia, though the most powerful, is not the only efficient agent in hemlock.

Conia appears, from the experiments of Geiger and Christison, to be a deadly poison to all animals. It acts with the most extraordinary rapidity; but if it fail to kill, its injurious action passes quickly away, and perfect recovery follows. It acts through every texture of the body where absorption is readily carried on. It acts as a local irritant; but its ultimate and fatal energy is chiefly exerted on the spinal chord, to which its influence is conveyed by entering the blood and producing on the inner membrane of the blood-vessels a peculiar nervous impression, which is instantly conveyed by sympathy along the nerves to the organ remotely and ultimately affected. 'It exhausts the nervous energy of the spinal chord, producing general muscular paralysis and asphyxia from relaxation.' The heart however is exempt from this general paralysis, contracting vigorously for a long time after all motion and respiration and other signs of life are extinct. It is therefore extremely probable, as suggested by Dr. Christison, that where a dose is not so large as to produce immediate death, the carrying on of artificial respiration and administering vital stimulants, might save the life of the patient, especially as the action of the poison is so transient, and incapable of producing a permanently injurious impression.

In what way hemlock proves useful as a remedial agent in many diseases is by no means clear, unless it be by allaying irritability in the diseased parts, and giving an opportunity to the vital powers to recover their healthful action. That it lessens irritability in many diseased organs is certain, from the effects of the administration of even a few doses, especially in many cases of scrophulous affections, and above all from allaying the irritation of the lungs during the formation of tubercles, and indeed during all the subsequent stages of consumption. Even when inhaled along with the vapour of warm water the same good effect is said to follow, but this is rather doubtful. Its beneficial influence over external ulcers is however open to observation; and John Hunter remarked, that under the combined action of conium and cinchona-bark, many obstinate buboes, which resisted every other mode of treatment, soon took on a healing process. Many irritable or painful ulcers are soothed and improved by a hemlock poultice. Rheumatic pains, and those attending nodes, are most effectually allayed by conium and ipecacuan. From the very decided sedative action of conia on the spinal chord, Dr. Gordon has suggested that it will prove a useful remedy in tetanus, and other spasmodic diseases. The catalogue of diseases in which it has been found useful might be greatly extended, but enough has been advanced to prove its value, and consequently the propriety and necessity of attending to the above-mentioned rules to obtain it in an efficient state. When the fresh leaves cannot be obtained, owing to the season of the year, the extract may be used. Dr. Christison states, that from an alcoholic extract he obtained the greatest quantity of conia; he was therefore disposed to consider this the most powerful form of preparation. But a carefully prepared watery extract which has subsequently been submitted to trial by him, was found to be, in equal doses, as powerful as the alcoholic.

Dr. Christison is of opinion that the Conium maculatum of the present day is not the plant which furnished the poison employed to dispatch Phocion and Socrates.

For many important particulars in this article we are indebted to Dr. Christison's 'Memoir on the Poisonous Properties of Hemlock and its Alcaloid, Conia.' (*Trans. of Royal Society of Edin.*, vol. xiii.)

CONJEVERAM, so called from a highly venerated pagoda built there, and dedicated to Vishnu Conjee, is a populous and flourishing town, in the district of Chingleput, in the Carnatic, in 12° 49′ N. lat., and 79° 41′ E. long. The town, which stands in a valley, is built in a straggling manner, being more than five miles long: the houses, many of which are handsome, are separated by extensive gardens and plantations of cocoa-nut trees. The town is surrounded by a hedge of the Agave Americana, a plant formerly much used in India as a defence against the incursions of bands of horsemen, who were accustomed to commit depredations upon defenceless places. The valley in which the town is placed is watered by the small river Wegawutty. Besides the pagoda above mentioned, there is a very large and lofty temple, dedicated to Siva, the view from which is very magnificent. Considerable manufactures of cotton goods, chiefly red handkerchiefs and turbans, are carried on in the town, where the weavers set up their looms under the shade of the trees. Conjeveram is celebrated in the ancient history of the country, and is well known to Europeans as having been the frequent seat of military operations during the Carnatic wars: the town is forty-eight miles S.W. from Madras. (Heyne's *Historical and Statistical Tracts on India.*)

CONJUGATE. This word is used in several branches of mathematics in a sense which (with one exception, and that might easily be abolished) may be described as follows: two points, lines, &c., are called conjugate, when they are considered together in any property in such a manner that they may be interchanged without altering the way of enunciating the property. Thus if A C be to C B as A D to D B, C and D are conjugate points with regard to this property.

A C B D

If we write D where C now is, and C for D, the property is still expressed in exactly the same way. We have other instances in conjugate diameters, conjugate hyperbolas [ELLIPSE, HYPERBOLA], conjugate foci. [LENS, MIRROR.]

The instance of exeption is the conjugate point of a curve, meaning a single point lying by itself, whose co-ordinates satisfy the equation of the curve, without its actually being on any continuous branch of the curve. [CURVES, THEORY OF.] It would be better to call this point *conjunct* than use a term which destroys the generality of language. But the best term, in our opinion, would be *evanescent oval.* [See the article already cited.]

CONJUGATION of a verb is a term in Grammar denoting the addition of suffixes or prefixes to the crude, or elementary form of a verb, for the purpose of denoting respectively, person, number, time, state, mood, and what is generally understood by voice. In the English language, prefixes are commonly used for these purposes, and these prefixes are not printed in connexion with the verb, though the voice presents them in one mass. Thus *I shall have heard*, as pronounced, is not less one word than the Latin *audi-v-er-o*. In this example therefore, *I, shall, have*, are virtually prefixes, and the letter *d*, a contraction from *ed*, is a suffix attached to the simple verb or crude form *hear*. In the ancient languages, such as Greek, Latin, and Sanscrit, suffixes are commonly but not exclusively preferred. [AR

The suffixes which denote the *persons* ... pronouns more or less corrupted. Thus ... at analysis,

the full form of the pronoun which signifies *I*; but as three syllables would be too long for a term in such frequent use, and this inconvenience in the present instance would be aggravated by an appearance of egotism, the word was shorn of its exterior letters, and at the utmost the three middle letters, *ome*, were attached to the verb. We see them in the Greek form *tupt-ome-s* or *tupt-ome-n*, 'we strike.' In the Latin, the vowels were corrupted, so that instead of *ome*, either *umu* or *imu* occur, as in *s-umu-s*, 'we are;' *poss-umu-s*, 'we are able;' *scrib-imu-s*, 'we write.' The old German has nearly the same suffix in *war-ume-s*, 'we were;' *bir-ume-s*, 'we be.' Again the three letters, *ome*, deprived of the last vowel, became *om*, as Greek, *tupt-om-ai*, 'I strike myself;' *um*, as Latin, *s-um*, 'I am;' *poss-um*, 'I am able;' or *on*, as Greek, *e-tupt-on*, 'I was striking.' But the first vowel might disappear instead of the last. Thus *me* is the form which appears in the Greek *es-me-n*, or *es-me-s*, 'we are;' *mi* is used in *es-mi*, *e-mi*, *ei-mi*, 'I am;' *di-do-mi*, 'I give,' &c. Sometimes the *m* is all that appears, as *scribeba-m*, 'I was writing.' In Greek, this final *m*, by a principle constantly observed in that language, becomes an *n*, as *e-n*, 'I was;' *etetuphei-n*, 'I had struck.' Another form of the suffix is *o*, instead of *om*, which is common both in the Greek and Latin, as Greek, *tupt-o*, 'I strike;' Latin, *scrib-o*, 'I write.' Finally, all trace of the pronoun at times disappears, and the defect ceases to mislead because the other persons have their characteristic terminations. Thus the Greek tenses, *etupsa*, 'I struck;' *tetupha*, 'I have struck;' and *etetuphea*, 'I had struck,' contain no remnant of the pronoun. In the English language there are some slight traces of the personal suffixes, which existed in full perfection in some of the older forms of the Teutonic languages. The word *am* has a remnant of the first person suffix in its final *m*.

The second person in the Greek and Latin languages, was *su* or *tu*, in German, *du*, and in English, 'thou.' Accordingly we find a sibilant attached to the verb to denote the second person, as in the Greek, *es-si*, 'thou art;' *ois-tha*, 'thou knowest;' *tupt-es-ai*, 'thou strikest thyself;' in the Latin, *scrib-is*, 'thou writest,' and in the English termination *est* in *knowest*, *strikest*. But as the Latin form has a *t* instead of an *s*, *tu* not *su*, so the *t* occasionally appears as in Greek, *tupt-ete*, 'you strike;' Latin, *scribiti-s*, 'you write;' and in the English, '*art*,' 'thou art.'

The third person is an indefinite term; and the suffix which denotes it is derived from *to*, signifying *this*, which is the full form of the Greek article, and again appears, on the one hand in Latin, in the derivatives, *tam*, *talis*, *tantus*, *tot*, *tum*, and on the other in the English, *the*, *this*, *to-day*. It is therefore as general as the English article *the*, and may denote indifferently, the *man*, *the woman*, *the thing*, in other words, *he*, *she*, *it*. It appears as a suffix in the Greek, *es-ti*, 'he is' (Sanscrit, *as-ti*); *tupt-et-ai*, 'he strikes himself;' in the Latin, *es-t*, 'he is,' *scrib-it*, 'he writes;' and in the obsolete form of the English language, *walk-eth*, now corrupted into '*walks*.'

Suffix of *number*. If a sign be employed to denote plurality, the absence of that sign will be a sufficient indication of the singular. Now the suffixes of plurality in English are *s* and *en*, as in *dogs*, *oxen*. The same are employed in Greek and Latin, as, first person, Gr., *tupt-ome-s* or *tupt-ome-n*, Lat., *scrib-imu-s*; second person, Lat., *scribiti-s*. The Greek has dropped the *s*, as in *tuptete*, a corruption probably of *tupteti-s*, just as the Latin imperative *scribite*, must be looked upon as reduced from *scribitis*. In the third person the mark of plurality appears to have been prefixed to the pronoun suffix, as in the Greek, *pha-n-ti*, 'they say;' *tupt-on-ti*, 'they strike;' Lat., *scrib-un-t*, 'they write.'

Time or tense (Fr. *temps*) divides itself into past, present, and future, where again the idea of present time will not require any peculiar distinction, if the ideas of past and future have their proper symbols. The past time appears to have had for its characteristic, either the prefix, *e*, or the suffix, *sa*, *ha*, or *a*. The former appears in the Greek, *e-tupt-on*, 'I was striking;' *e-tup-sa*, 'I struck;' *e-tetuphea*, 'I had struck.' The second appears in two of the Greek forms just enumerated, and in the Latin, *scribeb-a-m*, 'I was writing;' *er-a-m*, 'I was.' A very distinct example of a future suffix appears in those European languages which are derived from the Latin. Thus in the French, *écrir-ai*, are really two distinct words, the infinitive, *écrire*, and tense of *avoir*, forming altogether, *écrir-ai*, i.e., 'I shall write.' This origin of the French future is placed beyond a doubt by a comparison with the Spanish and Italian.

By the term *state*, which stands fourth in the series of suffixes which have been included in the definition of conjugation, it was intended to denote the notions of perfect and imperfect action. Here again one suffix is sufficient, and the notion of completeness is variously marked:—1st. By a doubling of the verb upon itself. The purest example of this is presented in the Gothic, *ga-laia*, 'I laugh;' *laílô*, 'I laughed;' *stauta*, 'I strike;' *staistaut*, 'I struck.' The Greek have perfects formed upon this principle in *te-tupha*, *ge-grapha*; the Latin in *te-tuli*, *de-di*, *spo-pond-i*, (for the less easily pronounced *spo-spond-i*). And in our own language there is strong reason for believing that such is the origin of *did*, the perfect of *do*. Out of the same principle grows the formation of the perfect by a long vowel, *vēni* being probably a contraction from *ve-ven-i*. 2nd. By affixing the letter *s*, which is probably a corruption of the verb *es*, to be; a supposition strengthened by the fact, that the past perfect *scrips-eram*, and the future perfect *scrips-ero*, are undoubtedly formed by the addition of *eram* and *ero* from that verb. The same would also be found on investigation to be the case in the Greek *etetuph-ea*, 'I had struck;' and lastly, in our own language the same verb is used for this purpose in such phrases as '*I am recovered*.' 3rd. By the letter *v*, which may possibly be a remnant of the auxiliary verb *habe*, 'have,' in accordance with the practice of nearly all the languages of modern Europe. Examples of this suffix are abundant in Latin, as *ama-vi*, 'I loved.'

The suffixes of the *moods* could not be placed in a distinct point of view without a detailed investigation. It may be sufficient to point out that *to* is distinctly observable as a suffix in those parts of the so-called Latin imperative, which strictly deserve that title; for the forms which do not contain the syllable in question, are at the same time devoid of the notion to command. That the suffixes of the potential, subjunctive, and optative moods, in the Greek and Latin, were originally distinct words, and perhaps verbs, like our own *may*, *can*, &c., is probable from general principles, and is confirmed by the appearance of the separate particles *ken*, *ke*, *an*, in the Greek language, which are used in connexion both with the indicative and other moods.

The last suffix for consideration is that which denotes the *voice*. The Greek grammarians acknowledge a middle or reflective voice; but the Latin language in fact possesses the same, as for instance in *accingo-r*, 'I gird myself for the contest;' *nito-r*, 'I support myself;' *lavo-r*, 'I wash myself,' 'I bathe.' And in both languages the middle voice is the parent of the passive. This may be illustrated by such phrases as the French *les bas se vendent ici*, 'stockings sell themselves here,' *i. e.*, 'are sold;' the Italian *si dice*, 'it is said,' strictly *it says itself*. Now the suffix of the Latin passive appears in the various forms *ur*, as *monet-ur*, *er* as *moneri-er*, *r* as *moneo-r*; but the attentive Latin student is ever ready to suspect when he meets with an *r*, that an older form of the word contained an *s*; and in fact we find an *s* in the form *moner-is*, where moreover the first part *moner* is another example of the corruption in question, for it supplies the place of *mones*. If then *s* is the original consonant of this suffix, we are forthwith directed to the reflective pronoun *se*; nor ought we to be stopped by the fact that this pronoun in Latin is confined to the third person. In the Russian and other Sclavonic languages, the connexion of which with the Teutonic languages and with those of Greece and Rome is indisputable, the reflective pronoun, containing in fact the very same root as *se*, is applicable alike to all the persons; and indeed there was nothing in the nature of things to limit the Latin pronoun as to *person*, when it is confessedly unlimited as to *gender* and *number*.

The division of verbs into several conjugations depends upon the last vowel or consonant of the verb in its simple or crude state. Thus in the Latin language all verbs ending in *a* are said to be of the first conjugation, all that end in *e* of the second, those in a *consonant* or *u* of the third, and those in *i* of the fourth or last; for it accidentally happens that the Latin language possesses no verbs in *o*, except the fragmentary forms *gnoo*, *ignotus*, *notus*, *aegrotus*, which appear to imply the existence of stems in *o*, viz., *gno* (in English, 'know'; compare the Greek *ge-no-ka*), *aegro*. The Greek language is not without a class of verbs having *o* for the final letter, as *doulo*, *zeloo*, &c. The division of verbs into conjugations is founded upon the fact that the

union of the final letters in the crude form of the verb with the initial letters in the suffixes leads to changes dependent upon these letters.

CONJUNCTION and OPPOSITION (Astronomy). Two heavenly bodies are said to be in conjunction with respect to a third, when they have either the same longitude (measured on the ecliptic of the third) or the same right ascension (measured on its equator). But as it is the second position which is usually meant by conjunction, the first is called the ecliptic conjunction. Thus in every eclipse of the sun, there is a conjunction of the sun and moon, both equatorial and ecliptic, not however at the same moment, unless the eclipse be perfectly central. There is also a conjunction at every new moon.

Opposition (equatorial or ecliptic) is when the bodies are exactly of opposite right ascensions or opposite longitudes, that is, when their longitudes or right ascensions differ by 180°. Thus there is always an opposition of sun and moon at every full moon, and both oppositions are at the same moment in the middle of a central eclipse.

The conjunction of a planet with the sun prevents its being observed, as it is then always in the brightest part of the heavens: it is nevertheless an important element in the theory of the planets. But at the opposition (an equally important point in theory) the planet is always in the darkest part of the heavens. Both therefore in theory and practice, comparisons of observations and theory near the opposition are desirable: and accordingly astronomical ephemerides usually give very close computations for these periods.

Apparent conjunction and opposition take place when the right ascensions are the same, or opposite to the spectator or the earth's surface: *true* conjunction, &c., refers to a spectator supposed to be at the earth's centre. [APPARENT.]

CONJUNCTIONS. Under this term grammarians commonly include several classes of words which have little similarity of meaning, and which, in their etymological origin, may be verbs, substantives, adjectives, or prepositions. The old definition of a conjunction, that it was a word which connected sentences together, will certainly not apply in all cases, if at least the word 'and' is to be included. It is true, as Horne Tooke observes, that "the sentence 'You and I and Peter rode to London' may be resolved into three: 'you rode,' 'I rode,' 'Peter rode.' But try some other instances: 'two and two are four;' 'AB, BC, and CA form a triangle;' 'John and Jane are a handsome couple.'—Does AB form a triangle?—Is John a couple?—Are two four?" (*Diversions of Purley*, Taylor's edition, i., p. 210.)

On the etymological origin of conjunctions, which is a distinct question from their use, some remarks will presently be made; in reference to their employment in the construction of a simple or compound sentence they may perhaps be divided into the following classes: 1. Conjunctions which unite either individual words, or phrases, or sentences, without, in the last case, implying any subordination of one sentence to the other. Such are the words: *and, or, nor;* or the double forms: *both—and—, either—or—, whether—or—, neither—nor—.* With respect to this class it may be useful to point out the great advantage which the Greek and more particularly the Latin language possessed in the variety of their forms for *and:* as *και, τε* in the former, *et, que, atque* or *ac* in the latter. This superiority over modern languages, simple as it is in itself, gave to the longest Latin sentence a perspicuity of arrangement, which in a great measure superseded the necessity for a cumbersome punctuation. (*Journal of Education*, vol. iv., p. 135.) 2. Conjunctions, which in themselves simply meaning *this*, being prefixed to a secondary sentence or phrase, direct the attention to that secondary phrase as a unit, and thus prepare it for subjection to some preceding word. This usage of the pronoun is as nearly as possible equivalent to the use of the bracket or vinculum in algebra, which connects the separate elements of any compound or polynomial term, and subjects it as a new unit to the algebraical operation, the sign of which is attached to the vinculum. Horne Tooke, in his remarks upon the so-called conjunction *that*, furnishes many examples: as, 'I wish you to believe that I would not willingly hurt a fly,' which is resolved by him into, 'I would not willingly hurt a fly; I wish you to believe that.' A mathematician would have expressed it by 'I wish you to believe [I would not willingly hurt a fly],' where the words within the brackets must be considered as a compound accusative or object after the verb *believe*. The Latin *ut* and *quod* in their origin are merely neuters of the relative, and the original meaning of the relative, it must be recollected, was *this*. [ARTICLE.] Hence they too are used in the same way as the English *that;* for example: *suadeo ut abeas*, 'I recommend *this*, you should go away;' *lætatur quod redieris*, 'he rejoices at *this*, you have returned.' Other examples may be found in the use of the Greek *ὁτι*, which is again the neuter of a relative, as: *λεγω ὁτι τεθνηκε*, 'I say *this;* he is dead.' In Greek there is sometimes a double accusative after the verb, one of which simply denotes the object of the verb, and the other points to the condition or state of the object, as explained by the words that follow it: thus, *ὁρω σε ὁτι κακως πασχεις*, literally, 'I see you *this*, (that) you are suffering.' This employment of the pronoun is more particularly to be noticed after prepositions. Thus, in the Latin language, if a simple noun be the object of a preposition, all that is required is to put that noun in a certain case, as *post cœnam*, 'after dinner;' but if a verb with its accessories is to be subject to a preposition, it is common to interpose the vinculum *quam*, 'this,' as, *postquam cum fratre suo cœnaverat*, 'after he had supped with his brother.' Even in English we might say: 'after that he had,' &c. Examples of this usage are abundant in the forms *antequam, præterquam, extra quam, præter quod, prout;* and the word *this* is sometimes doubly expressed, as in *pro eo ut, ad-eo ut, propter-ea quod, ex eo quod, præter quam quod.* The German idiom agrees precisely with the Latin, as may be seen in *nach-dem, in-dem*, &c., as opposed to the employment of the simple prepositions *nach, in*, &c. The French, too, have their *pendant-que*, &c., *puis-que*, &c., and the English their *besides that*, &c., *now that*, &c., and the old phrase *being that*, &c. 3. The pronoun in the several languages thus employed as a vinculum is frequently attached as an enclitic to the preceding word, and grammarians, not observing the distinction between the governing word and the pronoun, have often given the name of conjunction to the compound, as *postquam* in Latin, *ἐπει* in Greek, *puisque* in French, *nachdem* in German. 4. The vinculum, however, is not essential in those forms, and is therefore frequently omitted; but in case of this omission the governing word must immediately precede the phrase which is dependent upon it. This governing word, which expresses the nature of the connexion between the subordinate and the superior sentence, is also called a conjunction, but here the term is used in a different sense. The words which signify *this*, of which we previously spoke, found their claims to the title of a conjunction upon the fact that they unite the several elements which follow into a whole. When the governing particle is so called, it is because it binds the one sentence to the other. 5. There is a class of words which correlate with conjunctions: such as *so* in connection with *as* or *that*, *yet* with *although*, *therefore* with *since* or *because*. These words are often called adverbs, but as they too serve to connect sentences, they deserve like the rest the name of conjunctions. They bear, in fact, the same relation to the other conjunctions that the so-called antecedent does to the relative.

We have already said that conjunctions belong in their origin to all the leading parts of speech. Examples of verbs so employed are seen in the English *if*, formerly written *gif*, i. e. *give*. (Horne Tooke as before, p. 103, &c.) The Latin *licet*, 'although,' is evidently a verb signifying 'it is allowed.' So too *vel*, 'or,' appears to be an derivative of *volo*, 'choose;' and *si*, as well as the Greek *ει*, 'if,' have much resemblance to the imperative moods of the verb 'to be.' The English *while* and the Latin *dum* of the same meaning are substantives signifying 'time.' 'Either' and 'whether' are of course pronominal adjectives, and 'or' is a corruption from 'other,' as is evident from the German equivalent *oder*. And a similar analogy seems to lead to the derivation of the Latin *aut—aut*, from *alterum—alterum*. Conjunctions of a participial and prepositional character have occurred in the examples already quoted; but the relative form appears to be specially fertile in the production of this class of words, as, in the Latin, *quam, quando, quamquam, quamvis, ubi, unde, ut, quia, quod;* and the English *when, how, as, where.* In fact the relative itself has the power of a conjunction, as explained under the second head. [ARTICLE.]

Many of the conjunctions defy all attempts at analysis,

and certainly Horne Tooke, notwithstanding the acuteness and truth of his general views, has occasionally erred in the details of derivation.

CONN, LOCH, a large lake, 3½ miles from Ballina, in the county of Mayo in Ireland; it is 11 miles in length, with a coast of 53 miles and a surface of 14,000 acres. It is situated 27 feet above the level of the sea at Killala Bay, in which it discharges its water through the river Moy. The water power which could be procured from Loch Conn is estimated at equal to half the power of all the steam-engines in Glasgow. Loch Conn is a double lake; its southern half is called Loch Cullin.

CONNAMARA. [GALWAY.]

CONNARA'CEÆ, tropical trees or shrubs, with pinnated alternate leaves having no stipules, polypetalous flowers having ten unequal hypogynous stamens, and a fruit consisting of one or more one-seeded follicles. Their seeds are remarkable for having the embryo at the end most distant from the hilum. The species are much alike in habit, not numerous, and possess no known properties that deserve to be mentioned.



[Connarus Asiaticus.]
An expanded flower, much magnified. 2. Its stamens and styles. 3. A section across the ovary.

CONNAUGHT, a province of Ireland, containing the counties of Galway, Mayo, Roscommon, Leitrim, and Sligo. It lies between 52° 52′ and 54° 25′ N. lat., and between 7° 33′ and 10° 15′ W. long. The latitude is about that of Yorkshire and Lincolnshire; but from its proximity to the ocean, the climate is much more moist and variable. It is bounded on the north and west by the Atlantic Ocean; on the east by the river Shannon, and the counties of Cavan, Fermanagh, and Donegal; and on the south by the county of Clare. Clare was at one time a part of this province, to which it would appear naturally to belong; but it is now annexed to Munster. The greatest length of Connaught, from Scariff on the borders of Clare on the south, to Mullaghmore Head on those of Donegal on the north, is 85 Irish, or 108 English miles; and its greatest breadth, from the boundary of Leitrim on the N.E. to Slyne Head on the S.W., 93 Irish, or 118 English miles. It is estimated to contain 3,660,451 statute acres; but this calculation probably falls much short of the actual amount, which cannot be ascertained till the completion of the Ordnance Survey of Ireland, now in progress.

The mountain-ranges are distributed round the coast. From their inland declivities the province has a comparatively level surface to the Shannon. This river thus becomes the main drain of the intermediate country. Its chief feeders in Connaught are the Suck and the Gara; the latter discharges the waters of Loch Gara and Loch Key, and the former, a large river, is navigable from its confluence with the Shannon to Balliforan, a distance of about 20 miles. The streams which flow to the ocean are much more numerous, but the body of water brought down by them is not so great. They take their rise chiefly in lakes, which are distributed through the mountain districts of Galway and Mayo. Of these, Lochs Corrib, Mask, and Carra discharge their united waters southward by Galway; and Loch Conn, Loch Anow, and Loch Gilly, northwards by Ballina, Ballasadera, and Sligo respectively. The rivers which flow westward from the lakes of Connamara and Erris are short and rapid in their course, and comparatively inconsiderable in the quantity of water; so that, with reference to its rivers, the province may be divided generally into three districts: that of the Shannon, that of the basin of Loch Corrib, and that of the basin of Loch Conn. The neighbourhood of Ballihannis in Mayo, about the centre of the province, forms the summit level from which these principal slopes diverge; and lines drawn from this point to Scariff on the south-east, Sligo on the north-east, and Westport on the west, will be found to mark pretty nearly the boundaries of each.

The limestone field of Connaught is very nearly co-extensive with the low district between the Shannon and the western elevations. The mountain-groups that inclose this plain present towards the inland field successive elevations of sandstone, clay-slate, granite, and quartz, corresponding pretty nearly with the development of the same strata on the opposite side of the island. The limestone field is very much encumbered with bog, which in Ireland is almost always found to rest on limestone gravel. An immense tract of ground in Galway, Roscommon, and Mayo, is thus rendered of little or no value; for the borders only of these bogs (some of them of twice the extent of the bog of Allan) are available for purposes of turbary. The remainder of the province is more mountainous than any other district of equal extent in Ireland; so that Connaught, in produce and population, is far behind the other provinces. An estimate may be formed of the condition of Connaught, as to religious and other instruction, by referring to TUAM. Its history, antiquities, and local description will be found under the heads of its separate counties.

Connaught was formerly a kingdom of the Irish Pentarchy. Its kings were of the race of O'Connor. It enjoyed a comparative independence until the year 1590, when it was made shire-ground under the 11th Eliz. c. 39, and divided into six counties, viz., those above enumerated and Clare, which had formerly been part of Munster. In 1602 Clare was re-annexed to the latter province, yet so late as 1792 remained on the Connaught circuit. In the various rebellions down to the end of the seventeenth century, Connaught was the refuge of the fugitive and dispossessed Irish. The Irish language is still very prevalent; and the condition of the poorer classes to this day attests the miserable circumstances which brought the population together. Employment is here more difficult to be obtained than in any of the other provinces. The average of wages is 7*d.* per day, and the average of employment for labourers is only 125 days in the year. Multitudes of the peasantry, especially from the counties of Mayo, Leitrim, and Sligo, annually emigrate in search of employment: a great part of every harvest of England and Lowland Scotland is reaped by these wanderers.

Numerous projects have been formed for the improvement of this province and the development of its great resources. It has been proposed to run a railroad from Dublin to Blackrod Bay on the western coast through the county of Mayo; and to Roundstone Bay in Connamara through the county of Galway; also to Sligo through the county of Roscommon, all by way of Athlone. Canals have also been proposed, as an extension of the Royal Canal to Loch Conn and Killala, and an extension of the Grand Canal from Ballinasloe to Loughrea. It is at present in contemplation to connect the lakes of Galway and Mayo, so as to form a line of navigation from Galway to Killala, through Lochs Corrib, Mask, Carra, Castlebar, Cullin, Conn, and the river Moy to Ballina, a distance of eighty miles, through a district susceptible of immense improvement. To con

nect these lakes it would require a series of cuts only seventeen miles in length, the remainder of the navigation already existing in detached lakes and parts of rivers. The line of navigation would pass through a country abounding in limestone, marble, compact granite, sandstone flags, marl, and brick and potters' clay, with an inexhaustible supply of turf fuel, all which are at present valueless from not being accessible.

The produce of Connaught which comes to market consists chiefly in black cattle, which are sold in immense quantities at the fair of Ballinasloe. There is a pretty brisk export of grain from Sligo and Ballina, but, generally speaking, the resources of the province remain quite undeveloped.

The progress of population has been rapid, as will be seen from the annexed table. Still it falls far short of that of the island at large. In the number of houses and inhabitants to a square mile, Connaught bears to the other provinces a proportion of little more than 2 to 3.

POPULATION OF CONNAUGHT. *No Return under Act of* 1812.

Date.	How ascertained.	No. of Houses.	No. of Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufacture, and handicrafts.	All other families not comprised in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	95,821	..	..	..	..	..	..	*478,000
1821	Under Act 55 Geo. III., c. 120	197,408	211,637	..	..	..	553,948	556,281	1,110,229
1831	Under Act 1 Will. IV., c. 39	224,638	239,387	184,528	23,613	31,246	660,498	683,416	1,340,914

CONNECTICUT, one of the United States of North America, is bounded on the south by Long Island Sound, which separates it from Long Island; by Rhode Island on the east; by Massachusetts on the north, and by the State of New York on the west. It has a sea coast of about ninety-five miles along the Sound, which is indented by several good harbours, of which New London, New Haven, Bridgeport, and Norwich, are the chief. The form of Connecticut is nearly that of a parallelogram, which is about eighty-five miles long from east to west, with a mean width of sixty miles from north to south. The area is about 5000 square miles, or about one-eighth less than that of Yorkshire.

Hartford, the capital, near the centre of the state, on the left bank of the Connecticut river, is in 41° 46′ N. lat., and 72° 45′ W. long. The surface of the country is generally uneven, but there are no lofty mountains. The principal ranges of high ground run from north to south in the direction of the Housatonick and the Connecticut, the two principal rivers of the state. The Lyme range on the east side of Connecticut river separates the lower basin of the Connecticut from the Thames. A range of high land of moderate elevation, called the Middleton Mountains, runs from Hartford on the Connecticut, past Middletown, to New Haven. The Housatonick mountains run along the western margin of the state, on the west side of the Housatonick river.

The Housatonick rises in Berkshire county, Massachusetts, in a fine plain 1000 feet above the sea, and running a general southern course through a picturesque valley, enters the Sound at Milford Point, after a course of about 120 miles.

The CONNECTICUT, which is a considerable river, rises in Lower Canada, about 45° 20′ N. lat., and its sources are supposed to interlock with those of the Androscoggin, Kennebeck, Chaudiere, and St. Francis. Its general course is S. by W. and then S.W. to the point where it breaks through one of the Appalachian ranges, and receiving the Passamsick, descends over the Barnet falls from the high valley in which it hitherto flows, into a lower basin. From the junction of the Passamsick it continues, as it did before, to form the boundary between New Hampshire and Vermont, and after a course of about 140 miles, it is deflected for a short distance to the S.E. by some high land. Resuming its general southern course, it enters Massachusetts. Below the confluence of Miller's river (which joins it on the right bank in Massachusetts about twelve miles south of the boundary between New Hampshire and Massachusetts), the river again abruptly bends to the west a few miles above Greenfield. It makes several other bends in Massachusetts, which state it leaves about five miles below Springfield. Its general southern course continues to Middletown in Connecticut, where it is deflected to the S.E. by some high land, and continuing this direction it enters the Sound. The whole course of the river is probably not less than 400 miles. The Connecticut is in many respects a very remarkable river. Its general course, as already described, is nearly due S.; though it receives numerous streams, they are comparatively of small importance. The river basin above the junction of the Passamsick, is about thirty miles wide: below this point it widens to about forty; the whole surface of the basin is calculated at about 9300 square miles. The river generally flows in a deep and often narrow valley, bordered by high lands, which, where they recede from the river, leave fine alluvial plains. One of these alluvial plains stretches uninterruptedly for forty miles from a little above Middletown, in Connecticut, to South Hadley, in Massachusetts. The sources of the Connecticut lie in a region with a mean elevation of at least 1200 feet above the sea, and four degrees north of the outlet of the river in Long Island Sound. These circumstances cause a considerable contrast in the climate of the different parts of the Connecticut basin, and, combined with the circumstance of the narrowness of the river valley, help to account for the dreadful inundations to which the alluvial tracts on the river are exposed. In September, 1828, the river rose at Hartford twenty-four feet above low-water mark, and did immense damage. The river is navigable for vessels drawing ten feet water to Middletown, which is at the head of tidewater, and thirty-six miles from the Sound; vessels drawing seven feet and a half ascend to Hartford, fifteen miles above Middletown. Though this river is much obstructed by rapids, falls, and shoals, it has been made navigable for boats of considerable size to the Fifteen Mile Falls in New Hampshire, a total distance of 250 miles.

The only canal in the state that is yet completed, is the Enfield canal, five miles and a half long, which was made to avoid the falls of the Connecticut. The Farmington canal, which is to connect Northampton in Massachusetts, with New Haven in Connecticut, will be seventy-eight miles long, when completed.

The soil of Connecticut is only of a medium quality, except in the river valleys, some of which contain rich alluvia. Agriculture is generally in a good state, and the pastures on the low lands are particularly fine. The minerals are iron, copper, lead, cobalt, plumbago, and coal.

The state is divided into eight counties, subdivided into 120 townships: the population is 297,675. Hartford, on the Connecticut, near the centre of the state, has a population of near 10,000. Newhaven, which stands on a bay on Long Island Sound, has a considerable trade, and a population of about 10,700. The legislature meet alternately at Hartford and Newhaven. Middletown, on the Connecticut, has manufactures of cotton, woollen, and arms, and a population of about 6900. New London, at the mouth of the Thames, with a population of about 4400, has some vessels engaged in the whale fishery. Norwich, with a population of about 5200, is a manufacturing town.

Yale college, in Connecticut, which is an old foundation, has a president and fourteen professors and tutors, with a library and a large collection of minerals. There is also a law and medical school connected with the college. Washington College, at Hartford, was founded in 1826. Hartford also contains a very well regulated asylum for the deaf and dumb. The Wesleyans have a university at Middletown. The State of Connecticut possesses large resources for education. The interest of the school-fund,

* Exclusive of the town of Galway, not calculated.

which amounts to 2,000,000 dollars, is appropriated to the support of elementary schools.

The legislative body is composed of a senate, consisting of twelve members, and a house of representatives, consisting of 208 members. The present constitution was adopted in 1818, up to which time the state was governed by the colonial charter granted by Charles II. in 1662. Connecticut sends six members to the House of Representatives at Washington, and two senators to the Senate.

CONNELL, SIR JOHN, was admitted an advocate of the College of Justice in the year 1788, and soon afterwards married the daughter of President Campbell. In March, 1796, he was made sheriff of Renfrewshire, and on Mr. Robertson's elevation to the bench he was elected procurator to the church of Scotland, May, 1806. In the end of the year 1815 he published the first edition of his 'Treatise on Tithes,' and in July following was advanced to be judge of the admiralty in Scotland. In May, 1818, he published his 'Treatise on Parishes,' and had afterwards the honour of knighthood. In July, 1830, the high court of admiralty and his office of judge-admiral were abolished by act of parliament. He died suddenly the following year.

CONNOR, a bishop's see in the archdiocese of Armagh, in Ireland; the chapter consists of dean, chantor, chancellor, treasurer, archdeacon, and four prebendaries. This diocese is very nearly co-extensive with the county of Antrim. It extends in length from N. to S. 57 miles, and in breadth from E. to W. 30½ miles. It contains 72 parishes, constituting 47 benefices: of these parishes, three and a part of a fourth are in the county of Derry, and a part of one is in Down. In 1792 the numbers were—76 parishes, 40 benefices, and 43 churches of the Establishment. In 1834 the numbers were—churches of the Establishment, 51; Roman Catholic ditto, 45; Presbyterian ditto, 96; and other houses of Protestant and Dissenting worship, 41. In the latter year the gross population of the diocese was 361,618; of whom there were 66,888 members of the Established Church; 95,545 Roman Catholics; 193,261 Presbyterians; and 5924 other Protestant Dissenters; being the proportion of one member of the Established Church, and three Presbyterians and Dissenters, or four Protestants of whatever denomination, to 1⅜ Roman Catholics; or as 2¾ to 1 nearly, from which it appears that Connor is the most Protestant diocese in Ireland. There were at the same time in this diocese, 562 schools, educating 32,938 young persons, being in the proportion of 9$\frac{11}{100}$ per cent. of the entire population under daily instruction, in which respect Connor stands tenth among the 32 dioceses of Ireland. Of these schools, 86 were in connexion with the Board of National Education, being in the proportion of one to six and a half.

Connor, from which the diocese takes its name, is an inconsiderable village situated on the Glenwhippy river, in the barony and county of Antrim. It was a place of some note in 1315, at the time of the invasion of Edward Bruce, by whom it was taken, after the defeat of the English under Richard, Earl of Ulster, before its walls. It is supposed to have gone to decay after the irruption of the expelled Irish in 1333. There are now no traces of an episcopal seat; a large Presbyterian meeting-house is the chief object in the village.

The bishopric of Connor was founded by Aengus, the son of Nissa, usually known as Saint Macnish, who died A.D. 514. He was the disciple of Olcan, who was the disciple of Patrick. Of his successors little is known until the time of Malachy O'Morgair, who was advanced to this see A.D. 1124. Prior to this time the diocese had fallen into a very barbarous state.

Its inhabitants are represented by Bernard of Clarevalle, who has written the life of Malachy in Latin, as being 'Christians in name, but Pagans in practice; caring neither for the rites of marriage nor of baptism; paying neither tithe nor first fruits; in fine, little better than beasts of the field.' Yet, such was Malachy's success in reclaiming them, that on his translation to the see of Armagh, in 1134, he is said to have left this diocese, which he had found sunk in iniquity, engaged in the practice of all the virtues. At this time the diocese was known indifferently as Connor and Dalnaruigh, or Dalaradia. Shortly after we find Reginald, bishop of Connor, subscribing witness to a charter of John De Courcy, the conqueror of Ulster. In the beginning of the fifteenth century the diocese appears to have relapsed into a barbarous condition: numbers of the people were without baptism; and one family, the clan Gillmore, of which Hugh Mac Adam Mac Gillmore was the chief, being in a state of civil and ecclesiastical outlawry, committed many atrocious sacrileges. Mac Gillmore himself is said to have destroyed no less than forty religious houses. He was at length put to death, 1407, by a party of the clan Savage, in the Franciscan Church at Carrickfergus, where he had taken sanctuary. Soon after, in 1442, one John, being bishop of this diocese, prevailed on Pope Eugene IV., contrary to the wishes both of the Irish primate and the court of England, to unite the sees of Down and Connor, which have so continued ever since. By the 3rd and 4th William IV., c. 37, sec. 121, the united bishopric of Down and Connor becomes augmented by the diocese of Dromore.

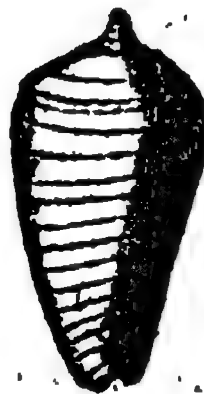
(Ware's *Bishops*; Beaufort's *Memoir of a Map of Ireland*; *Reports of Commissioners*.)

CONODYCTIUM. [POLYPIARIA MEMBRANACEA.]

CONOELIX, CONŒLIX, or CONOHELIX, a genus of turbinated shells, established by Mr. Swainson for a group which, in his opinion, 'form a beautifully defined link connecting the *Cones* with the Volutes, strictly so termed'—with the following generic character. 'Shell conoiform. Spire very short. Outer lip simple. Columella or pillar plaited. Aperture linear, narrow, longer than the spire. Generic type, Conœlix lineatus.' (Swainson.)

The animal, which is doubtless a gastropod, is not known.

Geographical Distribution.—Mr. Swainson (*Zoological Illustrations*) figures three species, and mentions that several specimens are in the Bankisian collection from the Pelew islands. To one of these species in that collection, Taheite, usually called Otaheite, is given as a locality. Mr. Cuming brought home another species, *C. Virgo*, which Mr. Swainson considers as representing *Conus Virgo*, from the reefs at the island of Rietea. It was in shallow water. Mr. Swainson says, in the work above quoted, that Mr. Humphrey informed him that he had at different times seen five or six other species besides those figured by Mr. Swainson, all of small size. Example. *Conœlix lineatus*. 'Shell smooth, whitish, with transverse capillary fulvous lines. Spire depressed, the apex prominent. Pillar six-plaited. Inhabits the South Seas?' (Swainson.) The figures, which are of the natural size, are copied from the accurate drawing in the *Zoological Illustrations*. All the other known species are comparatively small.




[Conœlix lineatus.]

De Blainville divides the genus *Mitra* into five sections, and makes his fifth consist of 'Imbricaria, Schum., and Conœlix, Sow.,' meaning Sowerby, but the genus is Swainson's, and is generally adopted.

CONOID (like a cone), a term sometimes applied, but in this country only, to the surface generated by the revolution of a conic section about its axis. [SPHEROID, HYPERBOLOID, PARABOLOID.]

CONON (Κόνων), an Athenian general, was the son of Timotheus. The first time he is mentioned in history is B.C. 413, in the eighteenth year of the Peloponnesian war, when he had the command at Naupactus on the Corinthian gulf. (Thucyd. vii. 31.) Conon was the chief of the ten generals who were appointed to the command of the Athenian fleet, when Alcibiades and Thrasybulus were removed from office, and, though at first beaten in a sea-fight by Callicratidas [CALLICRATIDAS], the Lacedæmonian general, he afterwards gained a signal victory at Arginusæ. Lysander being appointed a second time to the command of the Spartan fleet, engaged with Conon at Ægospotami, and defeated him, B.C. 405. Immediately dispatching to Athens the sacred ship Paralus with the news of the defeat, Conon himself fled to Salamis in Cyprus, where the friendship of the king, Evagoras, sheltered him from the obloquy or punishment which he would have encountered at home.

Isocrates has given us a pleasant picture of the intimacy which subsisted between the Athenian general and the

Prince of Salamis during Conon's residence in Cyprus. Here for a time he kept aloof from action, watching attentively the progress of affairs: the negotiations, which he soon commenced with the Persian satrap Pharnabazus, terminated in a speedy union of the Persian and Athenian forces with those of Evagoras, with the view of stopping the progress of the Lacedæmonians. Evagoras, Conon, and Pharnabazus together, raised a powerful fleet, in the command of which Pharnabazus was materially assisted by the experience of Conon. Falling in with the enemy's fleet near Cnidos, they gained a complete victory, B.C. 394: the galley of the Spartan general, Peisander, being driven on shore, most of his crew escaped; but Peisander disdained to save himself by flight, and was killed on board his ship. The consequences of this victory were of great importance to the interests of Athens; and Isocrates (*Philip.* §§ 94, 95) represents Conon as having completely destroyed the Lacedæmonian empire. Of the Grecian islands, some surrendered at once, and others showed a readiness to renew their old alliance. This was a juncture too favourable to be lost sight of, and accordingly Conon and Pharnabazus hastened to follow up their success by an invasion of the Thracian Chersonese. Town after town submitted to them, and the people abandoned their lands. Sestos and Abydos still held out, but the approach of winter at last put an end to the attempt at reducing them, and the satrap and Athenian admiral began to prepare for the operations of the ensuing spring, at the commencement of which they proceeded without delay to the coast of Laconia, and ravaged the country in various parts, B.C. 393. Conon seized the opportunity, which the flush of their present success afforded, for obtaining from Pharnabazus many important favours for his country. The satrap allowed him the use of his fleet for recovering the payment of tribute from the islands, and not only gave a large sum of money towards the rebuilding of the long walls at Athens, which had been demolished by the Spartans at the close of the Peloponnesian war, but sent men to assist in the work. At this time Conon appears to have returned to Athens, amidst the joy and congratulations of his countrymen: his portrait, which with that of Evagoras was placed beside the statue of Zeus Soter, was a slight memorial of their gratitude.

At the time when Antalcidas was sent on an embassy from Sparta to conclude a peace with the Persian king, Conon, the Athenian ambassador, was one of those who refused to give their assent to such terms as were proposed for their acceptance. The result was that he was imprisoned by the Persian minister Teribazus, on pretence of his adopting measures detrimental to the great king. What became of him afterwards we have no certain information. Nepos says, that according to some he was brought up before the king himself and put to death; while others affirm that he escaped from confinement. Xenophon, who relates his imprisonment, says nothing of his death. Lysias (*On the Property of Aristophanes*, §§ 635-646) gives an account of Conon's property, which was of considerable amount in Cyprus, and states that it was disposed of after his death; and Mitford (chap. xxv. § 6) has conjectured with good reason, that he escaped to Cyprus out of the hands of Teribazus, and died there. The words of Lysias (§ 640) certainly imply that he died a natural death, and was not murdered. He appears to have died about B.C. 388. (Clinton, *Fast. Hel.*) He had a wife in Cyprus at the time of his death. (Isocrates and Lysias, as cited above; Xenophon, *Hellenica*, i. 4-7; iv. 3-8; Diodorus Siculus, xiii. 48, 77, 78; xiv. 39, 79, 83, 84, 85, 86; Nepos, *Life of Conon*; Plutarch, *Life of Lysander*, and of *Artaxerxes*.)

CONON, of Alexandria, a friend of Archimedes, mentioned in his writings as having a great knowledge of geometry. He was the proposer of the spiral which bears the name of Archimedes. [SPIRAL OF ARCHIMEDES.]

CONOVULA. [MELAMPUS.]

CONRAD I., count of Franconia, was elected king of Germany A.D. 911, on the death of young Ludovic IV., the son of Arnulf, and the last of the Carlovingian dynasty in Germany. He was chiefly engaged during his reign in making his authority respected by the turbulent dukes or great vassals, his electors; among whom Henry, duke of Saxony and Thuringia, was the most powerful and most troublesome. The Huns too attacked Germany, and pushed their depredations as far as Bavaria. Conrad went to oppose them, and received a mortal wound in battle, A.D. 919. In his last moments he exhibited a wise policy. Knowing the ambition and power of Duke Henry, he recommended to his brother Eberhard and his other relatives the propriety of renouncing their own views, and of electing the Saxon duke; a measure which he looked upon as necessary to the salvation of Germany. His advice prevailed, and Henry, called the Fowler, was elected after his death by the title of Henry I. Conrad was never crowned emperor or king of Italy, the Italians having chosen a separate king, Berengarius, marquis of Friuli.

CONRAD II., called the Salic, duke of Franconia, was elected king of Germany after the death of Henry II., A.D. 1024. He annexed the vast dominions of Burgundy to the German confederation, forced the king of Poland to do homage for Silesia, and ceded the duchy of Schleswig to Canute, king of Denmark, as a fief, on the same condition. The great feudal nobles of Italy were at variance among themselves and with the towns. They had acknowledged the princes of the House of Saxony for their kings, and Conrad their successor crossed the Alps to enforce a like submission. He was crowned king of Italy at Monza by Heribert, archbishop of Milan, in 1026, after which he convoked a general diet of Lombardy in the plain of Roncaglia, near the Po, not far from Piacenza. In this diet he regulated the feudal legislation of Italy, the jurisdiction of the great feudatories, the successions, &c. He then proceeded to Rome, where he was crowned by Pope John XIX. as emperor and king of the Romans, with the titles of Cæsar and Augustus, A.D. 1027. Gisela, Conrad's wife, was crowned empress at the same time. Two kings, Rudolf III. of Burgundy and Canute of Denmark, were present at the ceremony. On Conrad's return to Germany, he was obliged to repress the insubordination of the great vassals.

Rudolf of Burgundy having died in 1033, the crown of that kingdom devolved upon Henry, Conrad's son, and Rudolf's nephew by his mother; but it was not without a war that Conrad secured his son's inheritance. About 1035 there was a general rising in Lombardy of the vassals, or sub-feudatories, against the great lords, secular and clerical, and especially against the archbishop of Milan. A battle was fought between Milan and Lodi, in which the archbishop was defeated, and the bishop of Asti was killed. In 1036 Conrad came down into Italy with an army to quell the disturbances; he deposed Heribert and imprisoned him, but the people of Milan rose in favour of their archbishop, and resisted all the forces of the emperor. During the two years that Conrad passed in Italy he visited Rome and Monte Casino, deposed Pandolfo, prince of Capua, and gave the principality to his brother. A pestilence having spread among the imperial troops in 1038, Conrad returned into Germany, and in the following year died at Utrecht. He was succeeded by his son, Henry III.

CONRAD III., of the House of Hohenstauffen, Duke of Franconia, and nephew of Henry V., was elected king of Germany in 1138, after the death of Lotharius II., who had succeeded Henry. Conrad had already been proclaimed king of Italy during the life of his uncle. Henry the Proud, of the House of Welf, Duke of Saxony and of Bavaria, who had married Lotharius's daughter, and whose sway extended from the Baltic to the Alps, had also pretensions to the imperial crown. Conrad, assembling a diet at Würzburg, stripped Henry both of Bavaria, which he bestowed on Leopold V., margrave of Austria, and of Saxony, which he bestowed on Albert the Boar, who was descended from the antient dukes of that province. A civil war was the result: Henry the Proud preserved Saxony, but dying in the midst of the war, his rights descended to his infant son Henry, afterwards styled the Lion. Welf, brother of Henry the Proud, expelled Leopold from Bavaria. A battle was fought at Winsberg in Suabia, between Welf and Conrad, which was lost by the former, and is memorable as having given rise to the distinctive names of Guelphs and Guibelines, which became the rallying words of two opposite parties that desolated Germany and Italy for centuries. At the battle of Winsberg, the war cry of the Saxons and Bavarians was that of their leader 'Welf;' and that of the imperial troops was 'Waiblingen,' a town of Würtemberg, the patrimonial seat of the Hohenstauffen family. The two names were originally applied to the respective adherents of the Saxon duke and of the emperor; but that of Welf soon became extended to all the rebels or disaffected to the imperial authority. The Italians, adopting the distinction long after, named Guelphs all the opponents, and Guibelines the supporters, of the imperial authority in Italy. Owing to the constant jealousy between the church and the empire, the popes and their adherents were gene-

rally found on the side of the Guelphs. For the moment however peace was made in Germany: Henry the Lion was acknowledged Duke of Saxony, and gave up Bavaria to the margrave of Austria. Albert the Bear was indemnified for the loss of Saxony by the erection of Brandenburg into an independent margravate, which his own successes over the Sclavonic tribes bordering on the Baltic soon raised to an equal rank with Saxony, Bavaria, Suabia, and the other great provinces of the empire. Having thus given peace to Germany, Conrad was induced by the preaching of St. Bernard to assume the cross. He set out with a numerous host for the East, by the way of Constantinople. In conjunction with Louis VII. of France, he penetrated into Syria, and besieged Damascus and Ascalon, but without success. Conrad having lost most of his followers, returned disappointed to Germany, which he found again distracted by the intrigues of Welf. He defeated Welf, and died in 1152, as he was preparing to set out for Italy to receive the imperial crown from the hands of the pope. He was succeeded by his nephew, Frederic of Hohenstauffen, Duke of Suabia, surnamed by the Italians 'Barbarossa.'

CONRAD IV., son of Frederic II. emperor of Germany, and king of Italy and of Sicily, was elected king of the Romans in his father's life time; but at the death of Frederic, A.D. 1250, he found a competitor for the crown of Germany in the person of William of Holland, who was supported by all the influence of Innocent IV. The pope excommunicated Conrad, as the son of the excommunicated Frederic, and released all his subjects of Germany and Italy from their allegiance. This was an epoch of the greatest animosity in Italy between the Guelphs and the Guibelines. The popes were bent on the destruction of the house of Hohenstauffen, the great leaders of the Guibelines, and who had stoutly resisted the universal temporal sovereignty which was assumed by the see of Rome. Naples, Capua, and other towns of Apulia and Sicily, revolted against Conrad, but Manfred, the natural son of Frederic, who had been left regent of the kingdom in the absence of his brother, brought back most of them to their allegiance, and laid siege to Naples.

In 1251 Conrad, on arriving in Italy, was well received by the Guibeline party, which was strong in Lombardy, especially at Verona, Pavia, Cremona, Piacenza, Tortona, Pistoia, and Pisa. In 1252 Conrad passed into Apulia, and on receiving the oath of allegiance from many of the barons, he asked the pope for the investiture of the kingdom of Sicily and Apulia; but the pope maintained that all Conrad's rights were forfeited through the rebellion of his father against the authority of the church. Conrad, strengthening his army with the Saracen colonists who had been removed from Sicily by his father and settled in Apulia, at Lucera, and in the neighbourhood, took Naples after an obstinate defence, and razed the walls of that town. Meantime the pope was offering the crown of Sicily, first to Richard of Cornwall, afterwards to Edmund III., son of Henry Crookback, of England, and, lastly, to Charles count of Anjou, who accepted it. In 1254, while Conrad was preparing to return to Germany to oppose William of Holland, he was taken ill at Lavello, in Apulia, and died soon after. The Guelphs spread a report that Manfred had poisoned him in order to possess himself of the crown of Sicily and Apulia, as they had already accused him of having hastened the death of his father Frederic; but these reports are deserving of little notice. [MANFRED.] Conrad left one only son, called also Conrad, who, on account of his tender age, was styled by the Italians Conradino, or little Conrad. Berthold of Hohenburg was left tutor of the young prince, who was brought up in Germany, and Manfred remained regent of the kingdom of Sicily and Apulia in the name of his nephew. For the Guibeline version of all those transactions, see Raumer's *Geschichte der Hohenstauffen*, and for the Guelph part, the numerous Italian writers, and Sismondi's *Histoire des Républiques Italiennes.*

CONRADIN, CONRADINO, son of Conrad IV. and of Elizabeth of Bavaria, was an infant when his father died in 1254. He was acknowledged as duke of Suabia, but his father's splendid inheritance of Sicily and Apulia passed into the hands first of Manfred and afterwards of Charles of Anjou, by the battle of La Grandella, A.D. 1265, in which Manfred was killed.

In the autumn of 1267 Conradin, when only 16 years of age, set out for Italy at the head of a few thousand men. At Verona he was well received by the great Guibeline leaders of N. Italy. He entered Rome without opposition, the pope being then at Viterbo, and thence took the road of the Abruzzi. He met his opponent, Charles, at Tagliacozzo, near the lake of Celano, on the 23rd of August, 1268. The battle was long contested; the Germans had at first the advantage, and, elated with success, were pursuing the French, when Charles, who had been lying in wait, came up with his reserve and completely routed them. Conradin escaped from the field of battle with his cousin Frederic Duke of Austria and others, and descending from the mountains reached the village of Astura, on the sea coast near the Pomptine marshes, expecting to find some means of reaching the fleet of his allies the Pisans, which was in the neighbourhood. But John Frangipani, Lord of Astura, seized upon him and delivered him up to Charles for a sum of money. He was taken to Naples, tried, and, notwithstanding the protest of a celebrated jurist, Guido da Luzzano, and others, he was condemned and beheaded in the market-place on the 29th October, 1268, together with Frederic of Austria and several of their followers. The story of the glove, said to have been thrown down by Conradin from the scaffold, to be delivered to Peter of Arragon, the husband of Constance, daughter of Manfred, does not seem sufficiently authenticated. A chapel was raised on the place of the execution. The chapel no longer exists; but in the vestry of the new church of Santa Croce al Mercato, built opposite to it, is a small column of porphyry, which once stood on the very spot of the scaffold, with a Latin distich commemorative of the event. (Valéry, *Voyages en Italie.*) Conradin's mother hastened from Germany to ransom her son. Coming too late, she used the money in founding the great convent Del Carmine, where the remains of Conradin and Frederic of Austria were deposited behind the great altar.

CONSALVI, E'RCOLE, CARDINAL, born at Rome in June, 1757, studied for the church, but applied himself likewise to belles lettres, music, and the arts. He became a monsignore, or prelate attached to the papal court, and was made, by Pius VI., Uditor di Ruota, or member of the highest civil court of the Roman State. When Cardinal Chiaramonti became pope he made Consalvi, whom he knew and appreciated, a cardinal deacon, with the title of Santa Maria ad Martyres, in August 1800, and appointed him at the same time his secretary of state or first minister.

In 1801 Consalvi repaired to Paris, and concluded the concordat with the first consul, Bonaparte. His pleasing manners and liberal opinions procured him marked attention during his stay in the French capital. In 1806, when Bonaparte began to quarrel with the pope, he insisted upon Consalvi being removed from his office, under the pretence that he was ill affected towards him, which meant in reality that he defended the interests and rights of his own sovereign. Consalvi himself urged the pope to accept his resignation for the sake of peace. Pius at last unwillingly received it, and appointed Cardinal Casoni his successor. Consalvi remained at Rome during the following years until the abdication of the pope in 1809. After that event he was exiled from Rome with the other cardinals, but some time afterwards he was allowed to join the Pope at Fontainebleau. On the release of the pope, and his return to Rome in 1814, Cardinal Consalvi was reinstated in his office of secretary of state, and continued the presiding minister of the court of Rome till the death of Pius, 20th August, 1823. Consalvi did not long survive his master and friend, to whom he had been faithfully attached through all the vicissitudes of a long and stormy pontificate, and between whom and him there was a sympathy of mind and a mutual confidence. [PIUS VII.] Cardinal Consalvi died at Rome in 1824. He was buried in the church of S. Marcello, where a monument was raised to him by the sculptor Rinaldi. An excellent full-length likeness of him by Sir Thomas Lawrence is in the king's collection of paintings.

Consalvi's administration of the papal state forms an epoch in the history of modern Rome. He abolished numerous abuses and old customs which were no longer in accordance with the state of society. He was favourable to rational change. By the Motu Proprio of 1816 all feudal taxes, monopolies, and exclusive rights were suppressed. Torture, and the punishment of the corda or estrapade, the use of which had long disgraced the most frequented street of Rome, were likewise abolished, as well as the punishment of death for the indefinite and undefinable offence of heresy. A new civil code, a commercial code, and a penal code were ordered to be framed. The maintenance of the registry of mortgages, introduced by the French, a better system of police, having in its service a respectable body of cara-

bineers or gendarmes, instead of the old worthless sbirri, and the establishment of workhouses for the poor in the principal towns; all these are the results of Consalvi's administration. He also took strong measures to extirpate the banditti from the Campagna, and in one instance, July, 1819, he ordered the town of Sonnino, one of their notorious haunts, to be razed to the ground. New concordats were entered into with France, Naples, Bavaria, and other German states. (*Compendio Istorico sù Pio VII.*, Milano, 1824; *Biografia degl' Italiani viventi*, art. 'Consalvi;' and Tournon, *Etudes Statistiques sur Rome.*)

CONSANGUINITY, or KINDRED, in law, is the relation subsisting between persons who are of the same blood, or, in other terms, who are descended from the same stock or common ancestor. Consanguinity, in this sense, is either *lineal* or *collateral*. The former subsists between persons who are related to each other in the direct ascending line, as from son to father, grandfather, great grandfather, &c.; or in the descending line from great grandfather to grandfather, father, and son. Collateral kindred are those who, though they have the same blood, derived from a common ancestor, and are therefore *consanguinei*, do not descend one from the other. Thus brothers have the same blood and are descended from a common ancestor, but they are related to each other collaterally, and the children and descendants of each of them are all collateral kinsmen to each other. The Canon Law and the Civil Law have adopted different methods of computing the degrees of collateral consanguinity. According to the former, which has been followed by the law of England, we begin at the common ancestor and reckon downwards to the persons whose degree of consanguinity we desire to ascertain, counting each generation as a degree; and the degree of consanguinity in which they stand to each other is the degree in which both of them, or the more remote of them, stands to the common ancestor. Thus (to use the example given by Sir William Blackstone), Titius and his brother are related in the first degree; for from the father to each of them is counted only one; but Titius and his nephew are related in the second degree, for the nephew is two degrees removed from the common ancestor; viz., his own grandfather, the father of Titius. On the other hand, in this supposed case, the civilians would place Titius and his nephew in the third degree of consanguinity, for they count all the degrees from one given person upwards to the common ancestor, and downwards from that common ancestor, whose degree of relationship to the first person it is the object to establish. Thus they would count from Titius's nephew to his grandfather two degrees, and one more from the grandfather to Titius. By the law of England, all persons related to each other by consanguinity or affinity, nearer than the fourth degree of the civil law, are prohibited from marrying, excepting in the ascending or descending line (in which the case is hardly possible by the course of nature); and by stat. 5 and 6 William IV., c. 54, sec. 2, it is enacted, 'that all marriages celebrated after the date of that Act between persons within the prohibited degrees of affinity or consanguinity, shall be absolutely null and void to all intents and purposes whatsoever.' Under the statute of distributions, 22 and 23 Car. II., c. 10, in making the distribution of an intestate's personal estate among the next of kin, the computation of degrees of kindred is according to the Civil Law. (*Novell.*, 118, and INTESTACY; Blackstone's *Essay on Collateral Consanguinity*, and Blackstone's *Commentaries*, vol. ii., p. 202.)

The question of consanguinity is the question of relation between two given persons, as explained above. If one of these persons is called [A], all his lineal ancestors will be found in (*a*) in the ascending line above him, and all his lineal descendants in the descending line below him. His collateral relations will be found in the parallel lines (*b*), (*c*), (*d*), &c. The Roman numerals denote the respective degrees of consanguinity in the Canon, and the Arabic those in the Civil Law. Thus, III. in the ascending line is A's great grandfather, and III. in the descending line his great grandson. In the ascending and descending lines the computation of the civil and canon laws, as already explained, is the same; in both laws the great grandfather and great grandson are respectively in the third degree from A. No. III. in line (*b*) is A's great uncle, who, according to the mode of reckoning already explained, is in the third degree of consanguinity to A by the canon law; and in the fourth, as denoted by the Arabic numeral 4, placed under III., by the civil or Roman law.

The following are the names for consanguinity in the Roman law. In line (*a*) ascending from A: 1, pater, mater; 2, avus, avia; 3, proavus, proavia; 4, abavus, abavia; 5, atavus, atavia; 6, tritavus, tritavia; all above 6 are included in the general name 'majores.' In line (*a*) descending from A:—1, filius, filia; 2, nepos, neptis; 3, pronepos, proneptis; 4, abnepos, abneptis; 5, atnepos, atneptis; 6, trinepos, trineptis: all below 6 are included in the general name of 'posteri' or 'posteriores.'

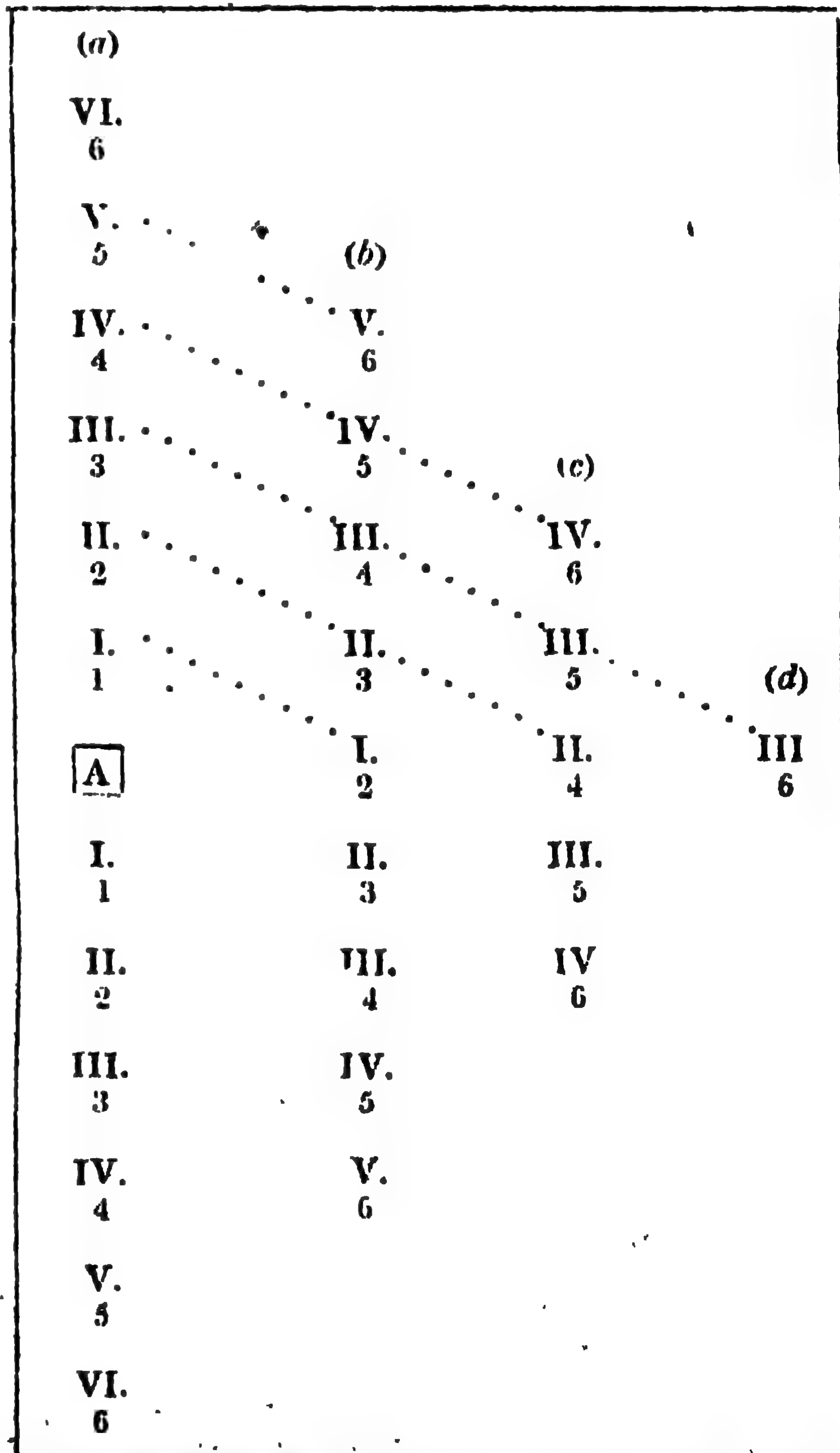
In line (*b*), beginning with 2 and ascending:—2, frater, soror; 3, patruus, amita (uncle and aunt on the father's side); avunculus, matertera (do. on the mother's); 4, patruus magnus, amita magna, avunculus magnus, matertera magna; 5, propatruus, proamita, proavunculus, promatertera; 6, abpatruus, abamita, abavunculus, abmatertera.

In line (*b*), beginning with 3 and descending, the names are, 3, fratris, sororis, filius et filia, and so on.

In (*c*), beginning with 4 and ascending:—4, consobrinus, consobrina, which are the general terms, but properly signify those born of two sisters (quasi consororini); sons born of two brothers are properly called fratres patrueles: daughters, sorores patrueles. 5, propior or prior sobrino, propior sobrina, the sons and daughters of the patruus magnus, amita magna, &c. (See Tacit. *Annal.*, xii., 64.)

Some of the Latin writers used 'nepos' to express a brother's or sister's son.

It is unnecessary to go farther. (*Institut.* iii. tit. 6, *De Grad. Cognationum.*)



CONSCRIPTION is the name given to the mode of recruiting the French army. Under the old monarchy the army was recruited chiefly by voluntary enlistment, and the soldiers were taken mostly from the peasantry, by whom the change from the condition of a daily labourer to that of a soldier was considered as an improvement. The officers were appointed from among the higher or educated classes. When the revolution commenced, the old army was broken up, the whole nation was called to arms, and volunteers were found in abundance. But as the soldiers were bound by no permanent obligation, a system of requisition was en-

forced, by which every district was bound to furnish a certain number of men for the regular army. But even this proved insufficient, and the Executive Directory found itself in want of soldiers to supply the numerous armies on the frontiers. In 1798 General Jourdan presented to the Council of Five Hundred a project of a law for a new mode of recruiting, under the name of conscription. This project was approved by the legislature, and passed into a law 5th of September, 1798. After setting down as a principle that every Frenchman is bound to defend his country when in danger, the law went on to say, that independently of danger to the country, every Frenchman from the age of twenty to twenty-five is liable to be called out to serve in the regular army. Every year lists were made in every department of the young men of the age above stated, divided into five classes, the first being those between twenty and twenty-one years; the second from twenty-one to twenty-two; and so forth. The number of men required for that year being made known by the Government, and voted by the legislature, a distribution was made among the departments and districts of the quota which each was to furnish. The number required was then taken by lot from the first or junior class, and when that was exhausted, from the second, and so on. This operation was repeated every year. The first levy by conscription in 1799 was 200,000 men. Bonaparte, when First Consul, found the system already established, and he applied himself strenuously to render it more effective, and carry it to the utmost extent. At the beginning of 1802 a levy was made of 120,000 conscripts, 60,000 of whom were to fill up vacancies in the army on the peace establishment, and the other 60,000 to form a reserve in case of war. In April, 1803, 120,000 more conscripts were levied out of the conscription lists for the years XI. and XII. In October of the same year, 60,000 more were levied out of the lists of the year XIII. By an arrêté 19 Vendemiaire, year xii. (12 October, 1803), severe penalties were enacted against refractory conscripts, that is, those who had not joined their regiments. Eleven depôts in various citadels were marked out for them, where they were to be kept under arrest, and work at the fortifications. They were also condemned to a fine, payable by their relations. In January, 1804, 60,000 men of the list of the year XIV. were levied. On this occasion, Bonaparte said to the Council of State that the law of the conscription was the dread and desolation of families, but that it formed the security of the state. (Thibaudeau, tome v. p. 319.) In 1805, just before the war of Austerlitz, a Senatus Consultum ordered a levy of 80,000 men. Till then the levies had been voted by the legislative body, but henceforth a Senatus Consultum was deemed sufficient.

In December, 1806, a levy was ordered of 80,000 men; in 1808, 80,000, besides 80,000 more of the conscription lists of 1810, to be called out in 1809. This was on account of the Spanish war, which the senate said was 'politic, just, and necessary.' Instead of men of twenty years complete, according to the original law, the young men now taken were not nineteen. In 1809, a new Senatus Consultum. 18th April, ordered a levy of 40,000; and on the 5th October, another of 36,000. In 1810 there was a levy of 120,000 of the lists of 1811, besides 40,000 conscripts of the maritime departments for the service of the navy. In 1811 the levy was 120,000 conscripts, besides those levied in Tuscany, the Roman states, Holland, and the Hanseatic towns recently annexed to the empire. As the levies increased, the repugnance of young men to the service became greater, and the severity of the government against refractory conscripts increased in proportion. A reward of twenty-five francs was given for seizing one. When there was a considerable number of refractory conscripts in a department, a moveable column was formed to hunt after them, and the soldiers were quartered in the houses of the relations of the fugitives, who were obliged to board them.

The disasters of the Russian campaign occasioned new expedients for raising men besides the regular conscription. Half a million of men was voted by the senate towards the end of 1812, consisting of 150,000 conscripts of 1813, 150,000 of 1814, 100,000 out of the lists of 1809, 1810, 1811, and 1812, who had not been included in the former levies, and 100,000 men of the first ban of the National Guard, who were formed into regiments of the line.

In November, 1813, another Senatus Consultum placed at the disposal of the emperor 350,000 more conscripts of the lists of 1813-14, who had not been included in the previous levies; and by a decree, 17th December of the same year, 180,000 men, taken chiefly from the National Guards, were ordered for the defence of the towns, as the allies threatened the French territory. And yet, notwithstanding these enormous calls, Napoleon, in 1814, had hardly 150,000 regular troops to oppose to the allies.

Besides the above conscriptions of the French empire, the kingdom of Italy furnished the following numbers:—in 1805, 6000; January, 1807, 9000; October, 1807, 10,000; 1808, 12,000; 1810, 11,000; January, 1811, 15,000; November, 1811, 15,000; 1812, 15,000; February, 1813, 15,000; October, 1813, 15,000.

Few soldiers, unless disabled by infirmities or wounds, ever got their discharge under Napoleon. The time of service was unlimited. By the present law of France, the harshness of the conscription, the principle of which, though not the name, is retained, has been greatly mitigated, and the soldier is entitled to his discharge after five years' service. Greater facility is allowed for procuring substitutes, which Napoleon admitted in principle, and even defended in the Council of State, as necessary 'in the present state of society, which was very different from that of Sparta or Rome;' but he afterwards surrounded it with so many difficulties, that substitutes became extremely scarce and expensive. Exemptions are also granted to the single sons of poor parents, and upon other humane considerations, as well as in cases of delicate health of young men applying to the learned professions, &c.; all which considerations were entirely overlooked in the sweeping conscriptions of the empire. A system somewhat similar to the conscription exists in Prussia and other German states. [PRUSSIA.]

CONSECRATION (consecratio), the act of sanctifying or making holy, consists in the solemn appropriation or dedication of anything to the service of the Deity. In modern times the consecration of men is usually called *ordination*, except in the case of kings and bishops, when the performance of the rites of sanctification is still named consecration. When applied to temples, churches, and altars, it is generally termed *dedication*. It is sufficient to advert to the religious antiquities of India, Egypt, Judæa, Chaldæa, Greece, Rome, and of the Celtic Druids in Britain and Europe in general, to show the antiquity of consecration. At the commencement of the Mosaic dispensation all the first-born of man and beast were consecrated to the Lord. (*Exodus* xiii., 2, 12, 15.) Subsequently the whole tribe of Levi was thus consecrated instead of the first-born (*Numbers* iii., 12, 45; viii., 16, 18); and Aaron and his sons, who were Levites, were more especially consecrated to the priest's office. (*Exodus* xl., 13.) The dedication or consecration of the tabernacle and altar is described in the book of *Numbers* ch. vii. Of the dedication of the first or Solomon's Temple, a description is given in 1 *Kings* viii., 5; and of the second temple in *Ezra* vi., 16. Under the Jewish theocracy not only men and beasts were consecrated to the Lord, but houses, fields, and the walls of Jerusalem. (*Leviticus* xxvii.; *Nehemiah* xii., 27.) At the commencement of the fourth century, when Christianity, under Constantine, became the established religion of the Roman state, and Christian temples began to vie in magnificence with those of the Pagan deities, they were consecrated with great pomp; for instance, the church of Jerusalem, built by Constantine over the supposed site of the Holy Sepulchre, when the ceremony was performed by a full synod of all the bishops of the east. (Euseb. *Ecc. Hist.*, l. 10, c. 45. Gratian, *Concordantia Discordantium*, part 3.)

The following are the principal parts of the rite of consecrating a church according to the Roman Catholic pontifical. Previous to the ceremony three crosses are painted on each wall of the church, and over each cross is placed a lighted candle. The bishop, in his pontifical vestments, proceeds to the church door, attended by his clergy reciting the seven penitential psalms; and after a solemn procession round the external walls, which are copiously sprinkled, in the name of the Trinity, with a kind of brush dipped in consecrated water, the bishop knocks loudly at the door with his pastoral staff, repeating from the 23rd Psalm, 'Attollite portas, et introibit Rex Gloriae;' to which a deacon, who is within the church, replies, 'Quis est iste Rex Gloriae?' The bishop responds, 'Dominus fortis et potens, Dominus potens in praelio,' &c.; then signing the door with the figure of the cross, he exclaims, 'Ecce crucis

signum! fugiant phantasmata cuncta.' On the admission of the bishop and clergy the *Veni Creator* is chanted, and ashes are strewn on the floor in the form of a cross, in which the bishop, with his staff, traces some alphabetical characters. After several prayers the altar is consecrated by sprinkling it with a mixture of water, wine, salt, and ashes, in the name of Jesus Christ; the solemnity closes by depositing in the altar a vessel containing relics and incense, with a parchment inscribed with the name of the bishop and the date of the consecration. The church, on this occasion, is richly decorated, and the altar is illumined with a profusion of large tapers. (Broughton's *Hist. Dic.*, vol. i., p. 311.) Churches are not recognised as such by the law of England until they are consecrated by a bishop. The form used by the Church of England is given at length in Bishop Gibson's 'Codex juris Ecclesiastici Anglicani,' pp. 1459-1463: see also Bishop Wilkins's 'Concilia Magnæ Britanniæ,' vol. iv. p. 668, and Burn's 'Eccles. Law, Churches,' sec. 2. The present form has been used since 1712; and in 1799 it was adopted, with some slight modification, by the episcopal church in America. One of the principal charges on which Archbishop Laud was arraigned before the Commons was, that he endeavoured to revive the Roman Catholic ceremonies in the consecration of churches and altars, with all their costly furniture. Still the Protestant form of consecration, as well as the Catholic, is an imposing ceremony; and the 21 stat. Henry VIII., c. 13, states as the reason for allowing a bishop six chaplains, that this number is requisite for the consecrating of churches. The village feasts which are still celebrated in many parts of England commence on the anniversary day of the consecration of the parish church, and are said to have been substituted by Pope Gregory the Great for similar festivities appertaining to the Druidical religion. (Bingham, b. 8, c. 9). Consecration is generally understood to change not the nature of the thing consecrated, but merely the *use* of it; and in this opinion the Catholics appear to acquiesce, with regard to numerous objects which they usually consecrate; as church bells, candles, water, oil, crosses, pictures, &c. But with respect to the consecration of the eucharistic bread and wine, they maintain that a complete change is effected in the thing consecrated,—the body and the blood of Jesus Christ, by the change of the bread into his body, and of the wine into his blood, being believed to be really present by virtue of the words of consecration. This is what is termed transubstantiation. (Brunet, *Parallèle des Religions*, 4to., 1792, tome iii., p. 310; *Exposition de la doctrine de l'E'glise Catholique, par* Bossuet.)

The consecration of animals was very common in antient Egypt, where birds, beasts, and reptiles were privileged, as in modern India, to live unmolested, and even to receive adoration. Athenæus and Ælian speak of sacred fishes, adorned with necklaces; so the sacred crocodile in Egypt was decorated with ear-rings. (Herodotus, ii. 69.) Consecration is a name given to the apotheosis of the Roman emperors, and coins and medals commemorating these events have the inscription CONSECRATIO. See an account of these funeral honors in the article APOTHEOSIS, and the medal with the legend CONSECRATIO in the article AURELIUS.

CONSERVATOR OF THE STAPLE, in the law of Scotland, an officer in the nature of a foreign consul, resident at Campvere, in the Netherlands. By the Act 1503, c. 81, passed, as the preamble states, for the welfare of merchandize, and to provide remedy for the exorbitant expense of pleas in foreign courts, the conservator of Scotland was vested with a jurisdiction to do justice between merchant and merchant in the parts beyond sea, such merchants being the king's lieges, and the conservator exercising his jurisdiction by advice of at the least four merchants, his assessors; and it was further provided by the Act, that no Scotch merchant sue another before any other judge beyond sea, nor do in the contrary of the statute, under the penalty set down therein. By subsequent Acts he was empowered to put the usury laws and other like laws in execution among the same merchants; so that the conservator might be regarded as a commercial judge with civil and criminal jurisdiction over native Scotsmen beyond the realm.

From the chapter immediately following that first above cited, wherein the conservator is required to come yearly home, or send a procurator for him, to answer all matters laid to his charge, we might suppose that appeal lay from him only to the king and council. But since the erection of the Court of Session, in 1532, he has been regarded as an inferior judge, and his court as an inferior court, which it is accordingly considered by Erskine in his 'Institutes,' b. i., tit. 4, sec. 32. In the case of Hoy *v.* Tenant, June 27, 1760, the Court of Session went still farther, and held itself as the *forum originis* of all Scotsmen, to have a cumulative jurisdiction with the conservator.

CONSERVATORS OF THE PEACE, before the comparatively modern institution of justices of the peace, were officers who by the common law of England were appointed for the preservation of the public peace. These conservators, whose powers were far inferior to those of modern justices of the peace, consisting almost entirely of the authority to take sureties for the peace and for good behaviour, were of several kinds. In the first place, certain high functionaries were general conservators by virtue of their offices. Thus the king, the lord chancellor or lord keeper, the judges of the court of King's Bench, and the master of the rolls, were intrusted by the common law with the general conservancy of the peace throughout the realm, as incidental to their several offices. Other officers again were conservators only in special places; thus the judges of the common pleas and barons of the exchequer were conservators of the peace only within the precincts of their several courts. In like manner, judges of assize and gaol-delivery within the places limited by their commissions; coroners and sheriffs within their several counties; the steward of the Marshalsea within the verge of the king's household; and constables and tithingmen within their hundreds or tithings, were all conservators of the peace at common law; and all the officers above enumerated retain their authority at the present day. But besides these official conservators there were others who were expressly intrusted with the charge of the peace, either by prescription, election, or tenure. Thus it is said that the owner of a manor might have prescribed that he and his ancestors, whose estate he had, were entitled to be conservators of the peace within such manor. So also as sheriffs were formerly elected, and as coroners still are elected, by the freeholders of the county, certain persons were, before the reign of Edward III., elected conservators of the peace in different counties. There were also instances in which lands were granted by the king to hold of him by knight's service, and also by discharging the duties of conservation of the peace within the county where the lands lie. Besides these, there were conservators of the peace appointed by letters patent from the crown, in cases of emergency, to defend particular districts, where breaches of the peace were apprehended in consequence of foreign invasion or intestine tumult. All the different kinds of conservators of the peace above noticed, excepting those who have the duty cast upon them as incidental to other offices, were entirely superseded upon the establishment of the system of justices of the peace, in the early part of the reign of Edward III. [JUSTICES OF THE PEACE.] (See also full details upon this subject in Lambard's *Eirenarcha*, book i., cap. 3.)

CONSERVATORY. The names given to the garden buildings employed for preserving plants in an artificial climate, are applied with so little precision, that it is almost a matter of indifference which to select for the purpose of explaining the principles that ought to be observed in the construction and management of such houses. We shall therefore reserve for the article GREEN-HOUSE what we have to say upon that head, and briefly dismiss the others as their names occur. In illustration of this remark we may observe that the term conservatory, which, as its meaning shows, was originally intended for buildings in which plants were preserved during winter, has come to be used, firstly for glass-houses in which plants are cultivated by growing them in the open border, and subsequently for all such glazed buildings whatsoever. A conservatory, properly so called, is a brick building heated by artificial means, having its whole southern part closed by large glazed sashes, which may be opened or shut at pleasure. Its floor is generally of stone, and a part of it is occupied by a stage on which plants in pots can be placed. One of these buildings, but in a ruinous state, may be seen in the physic garden at Chelsea; others are not uncommon in gardens that were laid out forty or fifty years ago, but they are fast falling into neglect and disuse—in our opinion undeservedly. Such a conservatory was intended to preserve during the winter orange-trees, myrtles, American aloes, and similar plants, which during the summer will flourish

in the open air, but which require in winter to be protected against the inclemency, or, to speak more exactly, against the cold and wet of the English climate. Such plants are torpid during winter; their rest begins with that of our trees, and it is easy to prevent a renewal of their growth at too early a time; to preserve them against too much wet and from severe cold, especially in the spring, is all that is requisite for them, and these objects the old conservatory answered perfectly well. It had moreover the advantages of being spacious without being excessively costly; of being easily heated, and of requiring the smallest possible amount of labour for the plants preserved in it. Persons however, gradually forgetting the original object of a conservatory, added to it numerous species requiring a very different treatment in winter from those it was contrived for; and what was far worse, they attempted by humidity and high temperature to keep the plants in a growing state all the winter. The necessary consequence of this was, that those plants which formerly succeeded in the conservatory became unhealthy, the new comers disappointed the expectations of their cultivators, and the building itself fell into discredit. The reason of this is sufficiently obvious. Plants when in a growing state require an abundant supply of light: a conservatory is particularly ill calculated, on account of its solid roof and sides, for the admission of light, and consequently a conservatory is not suitable for plants in a growing state; but plants when torpid, as in their winter season, require a very moderate supply of light, and this a conservatory is sufficiently calculated to admit.

A house of this kind is best suited for gardens of considerable extent, where a large number of plants is required during the summer for the ornament of the flower garden and shrubbery. Under such circumstances we strongly recommend the erection of conservatories as the cheapest, the most efficient, and the most ornamental mode of preserving in a healthy state during winter not only oranges, myrtles, and similar plants, but in general all the species which are natives of countries that, without experiencing severe frost, are cold enough during winter to suspend the vital energies of vegetation. It will be perfectly within the gardener's power to keep the earth in which conservatory plants grow sufficiently damp during winter to enable them to accumulate by the return of spring an abundant supply of new sap; and this is all that he need be particularly reminded of, if he understands his business scientifically; if he does not, advice to him would be only a waste of words. [Green-House.]

CONSISTORY is the court christian, or spiritual court, formerly held in the nave of the cathedral church, or in some chapel aisle or portico belonging to it, in which the bishop presided, and had some of his clergy for assessors and assistants. But this court is now held by the bishop's chancellor or commissary, and by archdeacons or their officials, either in the cathedral church or other convenient place in the diocese, for the hearing and determining of matters of ecclesiastical cognizance happening within that diocese. (Burn's *Ecclesiastical Law*, tit. *Consistory*.)

By stat. 24 Henry VIII., c. 12, an appeal lies from this court to the court of the archbishop of the province.

CONSOLS, a term familiarly used to denote a considerable portion of the public debt of this kingdom, more correctly known as the three per cent. consolidated annuities. This portion of the debt originated under an Act 25 Geo. II., whereby various perpetual and lottery annuities then outstanding, and which from the time of their creation had respectively borne an interest of 3 per cent., were brought under one head in the public accounts. Various additions have from time to time been made to the amount of these annuities; and, on the other hand, some diminution has been effected by the operation of the sinking-fund and the application of surplus revenue. The capital outstanding and unredeemed under this head, on the 5th of January, 1836, amounted to 356,768,258*l.* 4*s.* 6*d.*, and the annual interest or annuity to 10,703,047*l.* 14*s.* 11*d.*

CONSONANCE, in Music, a term which has, we think, often been explained with too strict a regard to its etymological meaning. That it signifies *one sound heard with another* is undeniable, but the two sounds must, in our opinion, be concords. [Concord.] *Consonance* and *dissonance* are words which, in music, ought to be considered as synonyms of *concord* and *discord*.

CONSONANT. [Alphabet, p. 379.]

CONSPIRACY. Every conspiracy to do an unlawful act which is injurious to individuals or to the public, is a misdemeanor at the common law of England. Many frauds affecting individuals, which cannot be made the subject of prosecution as such, become indictable when they are effected by the co-operation of several confederates. Thus where several persons agree by indirect means to impoverish a third person, as by circulating calumnies injurious to his character or credit, the offence is punishable as a conspiracy, though the concerted acts alone, when committed by individuals, could only have formed the subject of a civil action by the injured party. Another instance of this is, the case of a conspiracy among journeymen or servants to raise the price of wages, by refusing to work under a certain price. Any individual may fix what price he pleases upon his labour, and may lawfully refuse to work under that price; but if he conspires with others to do the same thing, he may be indicted for a conspiracy at common law In former times, persons convicted of conspiracy at the suit of the king (the nature of which offence is very doubtful), were liable to receive what was called *villanous* judgment, by which they were rendered incapable of acting as jurors or witnesses, their lands and goods were forfeited for life, and their bodies committed to prison. This judgment was never however inflicted upon persons convicted of conspiracies of a less aggravated kind at the suit of the party; and in modern times, the villanous judgment having become obsolete by long disuse, the punishment of conspiracy has been by fine, imprisonment, and sureties for good behaviour, at the discretion of the court. (Russell *on Crimes and Misdemeanors*, vol. ii.)

CONSTABLE. This word is supposed by Ducange, Spelman, Cowell, and other legal etymologists, to be corrupted from *comes stabuli*, which was another name for the *tribunus stabuli* or *prepositus equorum*, a kind of master of the horse, frequently mentioned as an officer of state in the middle ages. (See Ducange's *Glossary*, ad vocem *Comes Stabuli*.) Sir Edward Coke, Selden, and several other writers, insist upon another etymology—from two Saxon words, *koning*, a king, and *stapel* or *stabel*, a stay or support—*quasi columen regis*. Both these derivations are equally remote from the description of the office of our modern constable; but the former appears to be far the more probable; and, in accordance with it, the Constable of France was an important officer of the highest rank in that country, who had the chief command of the army, and had judicial cognizance of military offences; and whose duty it was to regulate all matters of chivalry, such as tilts, tournaments, and feats of arms. This office was suppressed in France by an edict in the year 1607; it was revived by Napoleon, and constituted one of the six grand dignities under the French empire; and was finally abolished upon the restoration of the Bourbon dynasty in 1814.

Immediately after the Norman conquest, we find in England an officer of the crown called the Lord High Constable, whose duties, powers, and jurisdiction were in most respects strictly analogous to those of the Constable of France. The office was one of great dignity and power, both in war and peace, the constable having the command of the army and the regulation of all military affairs. He was the supreme judge of the court of chivalry, in which character his encroachments upon other courts were so heavy a grievance in early times, that the stat. 13 Rich. II. c. 2 was passed to restrict his jurisdiction to 'contracts and deeds of arms and things which touch war, and which cannot be discussed or determined by the common law.' The office, for several centuries after the Conquest, passed by inheritance in the line of the Bohuns, Earls of Hereford and Essex, and afterwards in the line of their heirs-general, the Staffords, Dukes of Buckingham, in right of certain manors held by them by the feudal service of being constables of England. The fees of the office were extremely burdensome to the crown; and the possession by a subject of the hereditary right to command the militia of the realm, independently of any royal appointment, was an unusual and frequently a dangerous power; and on this account Henry VIII., in the early part of his reign (1514), consulted the judges respecting the means of abolishing the tenure. He was advised by them, that as the individuals holding the manors were only compellable to exercise the office *ad voluntatem regis*, he had the power of discharging the feudal service altogether; and acting upon this opinion, the king abolished the office, by disclaiming to have the services any longer executed. (See Dyer's *Reports*, p. 285 b.) The

effect of this was, that Edward Stanley, the last duke of Buckingham in that line, the hereditary high constable of England at the time of this resolution, held the manors after this period discharged of the service of being constable. All doubt which might have been suggested respecting the legal extinction of the office by this means, was removed eight years afterwards by the attainder of the Duke of Buckingham for high treason, upon which even the manors in question were forfeited to the crown. Since that time, the office of high constable has never been granted to any subject, excepting *pro hâc vice*, upon great and solemn occasions, such as the king's coronation or trials of peers.

'Out of this high office,' says Lambard, in his 'Duties of Constables,' 'the lower constableship was first drawn and fetched, and is (as it were) a verie finger of that hand; for the statute of Winchester, which was made in the time of Edward I., and by which the lower constables of hundreds and franchises were first ordained, doth, amongst other things, appoint that, for the better keeping of the peace, two constables in every hundred and franchise should make the view of armour.' He then concludes, in justification of his etymology of the term, that 'the name of a constable in a hundred or franchise doth mean that he is an officer that supporteth the king's majesty in the maintenance of his peace.' This derivation of the office of a common constable seems very improbable, especially as it is the better opinion that these officers were known to the common law before the statute of Winchester. (See Hawkins's *Pleas of the Crown*, book ii. cap. 10.) An ancient judicial authority, chief justice Fineux, in the reign of Henry VII., gives a more reasonable account of the matter. He says that when the superintendence of the peace of a county was found too great a task for the sheriff, hundreds were formed, and a conservator of the peace under the sheriff appointed in each, who was called a constable. This was the high constable, or constable of the hundred. In process of time, as population increased and towns grew into existence, it was found expedient to make a further subdivision for the preservation of the peace; and accordingly, conservators were appointed for manors, vills, and tithings, who were then called petty constables. (See *Year Book*, 12 Henry VII. pl. 18.)

Following this account of their origin, which is confirmed by many of the minute incidents of the two offices, constables, in the usual acceptation of the term at the present day, are of two kinds; constables of hundreds, who are still called high constables, and constables of vills or tithings, who are called either petty constables or tithingmen. Both high and petty constables were formerly chosen by the jury at a court leet, and were sworn in and admitted there by the lord or his steward; but at the present day the high constables are usually chosen by the magistrates at the quarter-sessions. The petty constables are still often chosen by the homage at the court-leet; but by the stat. 13 and 14 Car. II. c. 12, s. 15, it is enacted, that if any constable shall die or go out of the parish, any two justices shall make and swear a new constable, until the lord of the manor shall hold a court, or until the next quarter-sessions, who shall approve of them or appoint others. By virtue of this statute, and by reason of the disuse of courts-leet in modern times, the duty of nominating and swearing the constables is now generally discharged by the justices of the peace.

By the Metropolitan Police Act, 10 Geo. IV. c. 44, the police force are appointed by direction of the Secretary of State, and sworn in as constables by the commissioners; and in boroughs affected by the provisions of the Municipal Reform Act (5 and 6 Will. IV. c. 76), constables are now appointed by the Watch Committee under the authority of the 76th section of that statute. The office of constable at common law is a yearly appointment; and if any officer has served longer than a year, the justices at quarter-sessions will, upon his application, discharge him, and appoint another officer in his stead.

Besides these general constables, two or more justices of the peace, upon information that disturbances exist or are apprehended, are authorized by the stat. 1 and 2 Will. IV. c. 41, to appoint special constables; and by the 83rd section of the Municipal Reform Act, magistrates in boroughs are authorized to swear in as many inhabitants as they think fit to act as special constables when called upon.

In general, all the permanent inhabitants within a district, borough, parish, or place, are liable to serve as constables; but they must be persons of good character and of competent ability; and the lord or steward of the manor at the leet, or the justices, may exercise a discretion as to the appointment of proper persons. It is obligatory upon a constable who has been legally appointed to serve the office, unless he can show some lawful exemption; and if he refuses to serve, he may be fined or punished by indictment. The following persons are exempt from serving the office; namely, members of the colleges of physicians and surgeons in London, apothecaries in London, or within seven miles thereof, who are free of the Apothecaries' Company, and also those in the country who have served seven years' apprenticeship (see stat. 6 and 7 Will. III. c. 4); practising barristers, attorneys, dissenting ministers following no trade or other employment for their livelihood except that of a schoolmaster, and publicans.

The Metropolitan Police Act and the Municipal Reform Act contain provisions that the constables to be appointed under those statutes respectively 'shall have all such powers and privileges, and be liable to all such duties and responsibilities as any constable has within his constablewick by virtue of the common law of this realm.' In consequence of these provisions, it becomes of great practical importance to ascertain with precision the common-law incidents of the office of constable.

1. By the common law, constables are said to have been conservators of the peace; and in consequence of this character probably every constable has undoubted authority to arrest all persons who commit an affray, assault, or breach of the peace *in his presence*, and keep them in safe custody until they can be brought before a magistrate. It is said also by antient authorities that by virtue of his power as a conservator of the peace, he may himself, on view of a breach of the peace, take surety of the peace by *bond*, though he cannot do so by recognizance, being incompetent to administer an oath. But as his duty is to preserve the peace, and not to punish for the breach of it, it is doubtful whether he can arrest by his own authority and without a warrant, upon the information or charge of a third person, for an affray committed in his absence. (See the case of 'Timothy *v.* Simpson,' 1 Crompton, Meeson, and Roscoe's *Reports*, p. 760.) By sect. 9 of the Metropolis Police Act, and by sect. 79 of the Municipal Corporation Reform Act, constables appointed under those acts are expressly authorized, in charges of petty misdemeanor in the night time, to take bail by recognizance for the appearance of the offender before a magistrate within a limited time.

2. A constable having reasonable cause to suspect that a felony has been committed, may arrest and detain the supposed offender until he can be brought before a magistrate to have his conduct investigated; and he will be justified in so doing even though it should afterwards appear that in fact no felony was committed. In this case there is a distinction between the authority of a constable and that of a private person; the former may arrest if he can show a reasonable ground of suspicion that a felony has been committed; but a private person, in order to justify himself for causing the imprisonment of another, must prove, in addition to the reasonable suspicion of the individual, that a felony has actually been committed. A constable is bound to arrest any person whom he sees committing a felony, or any person whom another positively charges with having committed a felony; but generally speaking, he has no authority to arrest for a misdemeanour, either upon his own reasonable suspicion or the charge of another person, without a magistrate's warrant. With respect to the authority of a constable to arrest for felony or breach of the peace, Mr. Justice Buller is reported to have said, that 'if a peace-officer, of his own head, takes a person into custody on suspicion, he must prove that such a crime was committed; but if he receives a person into custody on a charge preferred by another of felony or breach of the peace, then he is to be considered as a mere conduit; and if no felony or breach of the peace was committed, the person who preferred the charge alone is answerable.' Lord Ellenborough, in the case of Hobbs *v.* Branscomb, (3 Campbell's *Reports*, 420,) said that 'this rule appeared to be reasonable.'

3. Constables were authorized by the common law to arrest such 'strange persons as do walk abroad in the night-season.' (See Lambard's *Constable*, p. 12.) This authority, which was perhaps sufficiently definite in times when the curfew was in practice and when watch and ward were kept, is at the present day of so vague a nature, that a

peace-officer could scarcely act under it without imminent danger of an action in every particular instance. It is however obviously essential to the efficiency of any system of police, that constables should be armed with some general authority of this nature, especially in towns. By the 7th section of the Metropolis Police Act, it is provided that 'any man belonging to the police force appointed under that act, may apprehend all loose, idle, and disorderly persons whom he shall find disturbing the public peace, or whom he shall have just cause to suspect of any evil designs, and all persons whom he shall find between sunset and the hour of eight in the forenoon lying in any highway, yard, or other place, or loitering therein, and not giving a satisfactory account of themselves, and deliver them to the constable in attendance at the nearest watch-house, to be secured until they can be brought before a magistrate.' The Municipal Reform Act contains a similar but less comprehensive provision, authorizing 'any constable appointed under that act, while on duty, to apprehend all idle and disorderly persons within the borough whom he shall find disturbing the public peace, or whom he shall have just cause to suspect of intention to commit a felony.' Besides these specific authorities, however, which apply only to the metropolitan police district and the boroughs affected by the Municipal Reform Act, there is no doubt that in general a constable, by virtue of his common-law authority, may stop any person carrying by night a bundle or goods under circumstances of reasonable suspicion; and if upon examining him his suspicions are not removed, he may detain him in his custody. A constable has also a general authority to apprehend for offences against the Vagrant Act, 4 and 5 George IV., c. 83, or against the Larceny Act, or the Malicious Injuries Act, 7 and 8 George IV., c. 29 and 30.

4. In the execution of a warrant a constable acts no longer as a conservator of the peace, but as a ministerial officer to the magistrate who signs it. He is the proper officer to a justice of the peace, and is bound by law to execute his warrants, and may be indicted for disobeying them. It is his duty to execute the warrant of a magistrate as soon as it comes to his hands; and where he arrests or distrains or does any other act, though it is not absolutely necessary by law that he should show his warrant, he ought always to give notice of it, and he will be wise to produce it in all cases where it is demanded; but as the warrant constitutes his justification, he is not required to part with it out of his possession. If the constable has a legal warrant to arrest for felony, or even breach of the peace, he may break open doors after having demanded admittance and given notice of his warrant; and if, after such notice, he is resisted and killed, it will be murder. If a warrant be directed to a constable by his name of office merely, he is *authorized* by the Stat. 5 George IV., c. 18, to execute it out of his own constablewick, provided it be within the jurisdiction of the magistrate who signs it; but he is not *bound* to do so, and may in all cases make his election whether he will go beyond his own precincts or not.

5. The law has made several provisions for the indemnity and protection of constables in the proper discharge of their duty. Thus by the Stat. 7 Jac. I., c. 5, if an action be brought against a constable for any thing done by virtue of his office, he may plead the general issue and give the special matter in evidence; and if he recovers, he is entitled to double costs. Formerly if a magistrate granted a warrant in a matter over which he had no jurisdiction, the officer who executed it was liable to an action of trespass for so doing; but by the Stat. 24 George II., c. 44, s. 6, it is enacted, that 'no action shall be brought against any constable for anything done in obedience to the warrant of a justice of the peace, until he has neglected or refused to show his warrant on being demanded so to do. And if after he has shown his warrant, any action is brought against the constable alone, without joining the justice who signed the warrant, the defendant, on producing the warrant at the trial, shall be entitled to a verdict, notwithstanding the defect of the justice's jurisdiction; and if the action be brought against the constable jointly with the justice, the constable is to be entitled to a verdict on proof of the warrant.' By the 8th sect. of the same statute, all actions against constables for anything done in the execution of their office must be brought within six months. For the further protection of constables, the Stat. 9 George IV., c. 31, sect. 25, enacts that persons convicted of assaults upon peace-officers in the due execution of their duty may be imprisoned with hard labour for two years, and be fined or required to find sureties for keeping the peace.

For the guidance of the metropolitan police force, the commissioners deliver to each of the men printed directions, which contain an accurate and perspicuous summary of the laws relating to the duties, liabilities, and indemnities of constables. In those boroughs which have adopted a new system of police under the Municipal Reform Act, similar codes of instruction have been issued to the constables. (For fuller information upon the whole of this subject, see Viner's *Abridgement*, Bacon's *Abridgement*, and Burn's *Justice*, title 'Constable.')

CONSTABLE, LORD HIGH, OF SCOTLAND. In the twelfth century we find

Hugh de Morvill, of the family of the De Morvilles, barons of Burgh, co. Cumberland, contemporary with one Edward, Conestabulus; himself constable of Scotland, and the possessor of vast estates in Teviotdale, Lauderdale, Lothian, Clydesdale, and Cuninghame. He died anno 1162, when his son,

Richard de Morvill succeeded him in his possessions and high office. On his death, anno 1189, he was succeeded by his son,

William de Morvill, who died, anno 1196, without issue.

Helen, his eldest sister, being married to Roland, lord of Galloway, the latter became constable in her right, and lord of Cuninghame; and on his death, anno 1200, the office passed to their son and heir,

Alan, lord of Galloway*. He died, anno 1234, leaving only female issue; of whom was

Helen, his eldest daughter, who being the wife of Roger de Quincy, earl of Winchester, the latter became constable in her right. He died, anno 1264, leaving, by the said Helen, daughters only; of whom

Margaret, married to William de Ferrariis, earl of Derby, was the eldest. It is said that William de Ferrars, of Groby, their son, was some time constable. But the countess retained the office, and then resigned it into the king's hands, in favour of

Sir Alexander Comyn, earl of Buchan, lord justiciar of Scotland, the husband of Elizabeth, her immediate younger sister; and on his death the office fell to his son and heir,

John Comyn, earl of Buchan, who was forfeited in the year 1308 for his adherence to the Baliol interest.

Sir Gilbert de Hay, of Errol, was then made constable of Scotland during pleasure; and in 1311 the office was bestowed on

David de Strathbogie, earl of Athol, in like manner during pleasure; but he being soon afterwards outlawed for espousing the cause of Baliol,

Sir Gilbert de Hay, before mentioned, got the office in fee and heritage in the year 1314; since which time the constable's staff, then put into his hands by Bruce, has remained in the Errol family.

The office and jurisdiction of the lord high constable of Scotland differ from those of the like officer in England. No formal distribution of the powers of the lord justiciar of Scotland, such as took place at the breaking up of the aula regis of England, was ever made in the former kingdom; nor when in the course of years this happened, did the once large powers of the justiciar pass to the like officers in the one country as in the other. On the new modelling of the judicial polity of England by King Edward I., the constable and mareschal were set over a court of chivalry, with jurisdiction in matters of honour and arms. But in these, the constable of Scotland never had jurisdiction. His jurisdiction was of the nature of that in England, vested by 33 Henry VIII. c. 12, in the lord steward of the king's household, or (in his absence) of the treasurer, comptroller, and steward of the marshalsea; for according to the Leges Malc. II., he judged jointly with the mareschal in all transgressions committed within certain limits of the king's court. But even this jurisdiction seems to have been exercised in fact by the lord justiciar; the constable only protesting against the interference with his powers. In the reign of King Charles I. a commission was issued to inquire into the nature and extent of the constable's jurisdiction; and they reported that it extended to all slaughters and riots committed within four miles of the king's person, or of the parliament

* He is mentioned in the charter granted at Runnymede by King John of England. Selden calls him 'Alan de Lewels [which is an evident error for Galweia], constabular. Scotiæ.' Selden, 'Eng. Epin.' c. 19.

or privy council. No alteration was made at the Union; and by the act 20 Geo. II. c. 43—which swept away so many other heritable jurisdictions—the office and jurisdiction of the lord high constable of Scotland were expressly reserved.

CONSTANCE. [Constanz.]

CONSTANCE, COUNCIL OF, was assembled in 1414 at the request of the emperor Sigismund, chiefly to put an end to the great schism, during which John XXIII., Gregory XII., and Benedict XIII., each claimed the rank and office of sovereign pontiff. The Council deposed all three, and elected Ottone, cardinal Colonna, as legitimate pope, by the name of Martin V. It was on this occasion that a canon or decree was passed, asserting the supremacy of a general council over the pope. Gregory and John XXIII. submitted to this decision, the latter after much demurring; but Benedict continued the schism in Spain to the time of his death. The Council was also engaged in the trial of John Huss, who was summoned and appeared before it, and was arrested by order of the Council, notwithstanding a safeguard from the emperor. His doctrines were condemned as heretical, and as he would not retract he was publicly degraded from his priestly office, and then consigned to the civil magistrates, who by order of the emperor had him burnt. For the peculiar doctrines of Huss, some of which concerned doctrine, and others discipline, see Huss. The Council condemned likewise the doctrines of Wycliffe, most of which were identical with those of Huss. Jerome of Prague, a disciple of Huss, having been brought before the Council, first retracted his obnoxious doctrines, but being still kept in prison, as his retractation was not considered to be sincere, he demanded a public audience, at which he declared that he had recanted only through a temporary weakness, and that he persisted in his master's doctrines; upon which he was also condemned to the stake, to which he went with the greatest serenity. Poggio Bracciolini, who was present at the tragical scene, bears full evidence, in his letter to Aretino, to the firmness of the victim; and so does Æneas Sylvius, afterwards Pope Pius II., in his 'Historia Bohemica.'

The Council had promised to occupy itself with a reform of church discipline, which was much wanted in that age; but it did little in that way, having been abruptly dissolved by the new pope, Martin V., in April, 1418. The Council of Constance is one of the most noted in the history of the church, and was one of the most numerous ever assembled. Lenfant has given a full and instructive account of all its proceedings, session after session. (*Histoire du Concile de Constance*, 2 vols., 4to., Amsterdam, 1727.)

CONSTANS, son of Constantine, had for his portion at his father's death, Italy, Africa, and Illyricum. His elder brother Constantine, being envious of his share, attacked him, was defeated, and killed near Aquileia, A.D. 340; after which Constans took possession of his brother's dominions, and became emperor of the whole west. Magnentius, commander of the troops in Gaul, having revolted against him, and drawn a great part of Gaul into his party, Constans, who happened to be in that province at the time, was obliged to take flight towards Spain, when he was pursued and overtaken at the foot of the Pyrenees by some emissaries of Magnentius, and killed, A.D. 350. He is represented by the historians as indolent and rapacious; Zosimus accuses him also of cruelty and other crimes, but Zosimus wrote under the influence of party feeling. The character however of all the three sons of Constantine is open to much censure. Constans protected the Christian faith, as established by the Council of Nicæa, against the Arians and Donatists, and he also shut up many heathen temples. After his death Magnentius took possession of Italy and of Rome, and styled himself Augustus, until he was overthrown by Constantius. [Constantius.]

CONSTANT, a quantity which remains the same throughout a problem. Thus in the question, required that point of a circle which is at a given distance from a given straight line, the radius of the circle is a constant. If the problem require the use of twenty different points of the circle, the radius is the same for all.

A constant may be determinate, or it may be indeterminate or arbitrary. Thus the proportion between the circumference and diameter of a circle is a determinate constant, being 355 to 113 very nearly; but in the problem, required the relation which exists between the abscissa and ordinate of a circle, the radius of that circle is an arbitrary constant.

The term constant is frequently applied to any remarkable or very necessary number which enters a question, as follows. By the *constant of aberration* is meant that one constant by the determination of which the aberration is obtained from its known laws at any given time; in this case it is the maximum aberration, or about $20\frac{1}{4}''$. [Aberration.] Thus we have the constant of nutation, the constant of friction, &c.

Nothing is more common in mathematical works than the term *variation of constants*, which appears a contradiction. But its meaning is as follows: a quantity which upon one supposition would remain constant, becomes variable by the introduction of another supposition. Thus, taking into account the earth's attraction only, the longitude of the moon's node is constant; but by the attraction of the sun and planets, its place is slowly changed. In this case one of the constants is said to vary.

CONSTANTIA, a farm situated about eight miles to the west of Cape Town at the Cape of Good Hope, which received its name in compliment to the wife of the Dutch governor of the colony, Vander Stel, by whom it was formed. This farm owes all its celebrity to the Constantia wine which it produces, and which is universally esteemed for its high flavour and luscious quality. The vineyard is of small dimensions, and the wine which it yields, both white and red, does not exceed from 8000 to 12,000 gallons annually, varying between these quantities according to the season. It has not hitherto been found possible to produce wine of equal quality upon any other spot within the colony

CONSTANTINE, POPE, a native of Syria, succeeded Sisinnius in 708. He visited Constantinople and Nicomedia, where he was received with great honour by the Emperor Justinian the younger. After his return to Rome he defended the worship of the images against John, patriarch of Constantinople, and against Philippicus, who had usurped the empire. Felix, archbishop of Ravenna, who had at first refused to acknowledge Constantine, and had been exiled in consequence, made his submission to him, and was reinstated in his see. Constantine died in 714, and was succeeded by Gregory II.

CONSTANTINOPLE (Stambool), literally, 'the city of Constantin,' in Roumeli or European Turkey, the capital of the Ottoman empire, is situated in 41° 0′ N. lat. and 28° 45′ of E. long., on the sea of Marmora (Propontis), and at the west end of the narrow channel of the Bosporus, which connects the sea of Marmora with the Black Sea (the Euxine). The ground on which it stands is fitted by nature for the site of a great commercial city, the connecting link between Europe and Asia. A gently-sloping promontory, secured by narrow seas, stretches out in a triangular form towards the Asiatic continent, from which its extreme point is separated by so narrow a strait (the Bosporus), that in a quarter of an hour a boat can row from one continent to the other. Indeed, Scutari, on the Asiatic coast, immediately opposite, is always considered as a suburb of the European capital. Just before the Bosphorus enters the sea of Marmora, it makes a deep elbow or inlet on the European shore, flowing between the triangle of Constantinople proper and its European suburbs of Galata and Pera, and forming the magnificent port of the Golden Horn. The triangle which, allowing for many vacant spaces within the walls, is entirely covered by Constantinople, is thus washed on one side (the northern) by the deep waters of the port, and on the other (the south-east) by the sea of Marmora. The base of the triangle, or the ground immediately beyond the walls, which attaches it to the European continent, is an open elevated flat, with some slight inequalities. The area of the triangle is occupied by gentle hills, which are highest towards the land side and the suburb of Eyoub, and gradually decline to the Seraglio point, the apex of the triangle, shelving off on each side to the sea of Marmora and the port. As Rome was built on seven hills, so the Roman founders of Constantinople called these the 'Seven Hills,' though, if the principal chain only were counted, there would be less; and if the minor hills or spaces were included, there would be more than seven. The ridge of the first hill, departing from the acute part of the triangle, is covered by the main building of the Seraglio, or vast palace of the Sultan, behind which, a little on the reverse of the hill, the dome of Santa Sophia shows itself. The second hill is crowned by the bold and lofty dome of the Osmanieh Mosque.* The still loftier mosque of Solyman the Magnificent towers on the third hill; whilst an antient

aqueduct, the arches of which are of a considerable span, and which is generally attributed to the Emperor Valens, unites the summits of the third and fourth hills. On a fifth point, the most elevated of the little chain within the triangle, there is a slender lofty tower, built in 1828, in which a guard is constantly kept to watch the breaking out of fires, which are very frequent and destructive in a city where all the private habitations are built almost entirely of wood. The situation of Constantinople upon hills is the main cause, not only of its picturesque beautiful appearance, but of its salubrity and comparative cleanliness. It receives all the breezes from the Bosporus, the sea of Marmora, and the adjoining plains of Thrace; and the dirt that might otherwise accumulate descends the hills' sides to the port or the open sea, in both of which it is carried off by a strong current. This natural local advantage is improved by the number of fountains and the abundance of running water which is always carrying off parts of the dirt, and by the heavy rains, which, when they fall, thoroughly cleanse the sides of the hills. The lower edge of the city that touches the port, and the suburb of Galata (the Wapping of the Turkish capital), on the opposite side of the port, may be called filthy places, but the term cannot be correctly applied to Constantinople as a whole, although from various other causes the interior of the city is far from being so beautiful and imposing as its external aspect.

The form of the triangle is somewhat irregular, the side on the sea of Marmora, from the old state prison called the Seven Towers to the Seraglio point, being considerably the longest; we have no exact admeasurement, but its length cannot be much short of five English miles. On this side the old walls and towers are in a very ruinous state, and on the side towards the port they have almost entirely disappeared. But on the land side Constantinople presents a double line of strong and lofty stone walls (the work of Theodosius II.), which might be easily put in a complete state of repair, and which, in their more dilapidated parts, present such magnificent and picturesque specimens of mural ruins as probably no other city can boast of. The length of this latter line of wall, from the head of the port to the sea of Marmora, is about four English miles. The walls are flanked at short intervals by towers, which are mostly rectangular. There are many Greek inscriptions inserted in their face; nor have the Turks been at the trouble to remove the numerous Greek crosses that are carved on the towers and over the gateways. Besides the double walls, which are almost entire, and still retain their antient battlements, the outer ditch was faced with a wall which made a third rampart, but this is in part destroyed, and seems never to have been defended by towers. Bondalmonte, a Florentine, whose plan bears the date of 1422, sets down one hundred and eighty towers, of which not more than one hundred and twenty are now standing. The intervals between the walls are in many places choked up with earth and masses of the ramparts which have fallen under the shocks of war or earthquakes. The great ditch, which is about twenty-eight or thirty feet broad, is partly cultivated and converted into kitchen gardens.

There are six gates on this side:—1. Egro-Kapoussi (the Oblique Gate); 2. Edrene-Kapoussi (the Gate of Adrianople); 3. Top-Kapoussi (the Cannon Gate), through which the conqueror Mahomet II. made his public entry on the capture of Constantinople; 4. Selivri-Kapoussi (the Gate of Selivria); 5. Yeni-Kapoussi (the New Gate); 6. The Gate of the Seven Towers. The 'Golden Gate,' so celebrated by the Byzantine writers, has been sought for in vain, though a gate now wholly blocked up, with two mean pillars supporting a low arch, is sometimes shown to travellers for it. Near to the Top-Kapoussi, where Palæologus, the last of the Christian emperors, fell, is the breach through which the Turkish besiegers poured into the city: the wide rent, which has never been repaired, is now full of trees and shrubs. A waste, a stillness, and a solitude, difficult to conceive near so great a capital, reign immediately beyond these walls, which are so lofty, that from the road which passes under them the eye can scarcely catch a glimpse of the mosques and minarets of the city. This melancholy aspect is heightened by several cemeteries, with dark cypresses and white marble tombs, that lie outside of the walls.

The size of the triangle on which Constantinople stands has been greatly exaggerated. Tournefort, in general a correct observer, makes the circuit of the triangle twenty-three miles (*Voyage du Levant*, let. xii.), but the length of the three sides does not in reality much exceed thirteen miles. Gyllius (*De Topog. Const.*, l. i., ch. 4), makes the whole circuit rather less than thirteen miles, thus agreeing pretty closely with Chalcondylas, who estimates it at one hundred and eleven stadia. (*Melet. Geog.*, Art. 'Opakh.') The treble walls and ditches on the land side, the extensive gardens of the Seraglio, and other palaces, the large court yards of the royal mosques, the Hippodrome and other vacant squares, materially diminish the extent of ground covered with houses.

With the exception of the land walls, and the church of Santa Sophia, there does not remain much of the Byzantine architecture; the greater part of the antiquities which were seen by Gyllius, by Spon, and other old travellers, have disappeared. The fact is, the Turks, instead of digging in the quarry, have knocked down the Grecian buildings to use the materials in their own public edifices, such as mosques, minarets, and fountains, and to cut them up into tomb-stones.

There is a vast subterranean edifice, the roof of which is supported by an immense number of columns, each column being oddly formed of three separate pillars placed one on the top of the other. The Turks call it the palace of the 'thousand and one pillars;' not that this is the precise number, but because it is a favourite number with all eastern nations. Though the earth has in part filled it up, it is still of great depth. It was originally one of the immense cisterns or reservoirs made by the Greek emperors, and always kept full of water by them, in case of a siege, though they have long been destroyed, or suffered to go to ruin, by the improvident Mussulmans. This particular one is dry, and a number of silk-twisters have taken possession of it, and ply their trade at the bottom in almost total darkness. There is another which still exists as a cistern, though it is hardly known except to a few Turks, whose houses are situated immediately above it, and who call it the 'Subterranean Palace.' It may be described as a subterranean lake, extending under several streets, having an arched roof that covers and conceals it, supported on 336 marble pillars.

The Turks retain the translated name (they call it the At-Meidan or horse-course) of the famed Hippodrome, but all the antient splendour of the place has disappeared. It is now not a circus, but an oblong open space, about 300 paces long by 150 wide. It is partly flanked on one side by the mosque of Sultan Achmet, and partly on the other by the high dead walls of a building which was once an hospital, but in 1828 a receptacle of a few wild beasts kept by the sultan. At the upper end of the Hippodrome there is a granite obelisk of rather mean proportions, and partly covered with hieroglyphics which are not of the best workmanship; it is called after Theodosius, though it is probable that emperor only removed it from another part of the city where it was erected by Constantine, and set it up here, after it had been thrown down by an earthquake. Near this obelisk is the fragment of the wreathed column of bronze, which has been the subject of many discussions. Whether it supported three serpents' heads, which Mahomet II. struck off at a blow with his battle-axe—whether it was brought from the oracular shrine of Delphi or not, we will not attempt to determine, but we can safely assert that it is now a poor mutilated thing, with one end stuck in the ground, above which it does not rise more than seven feet, with the other end open, and the hollow almost filled up with dirt and stones which the Turks have thrown into it. The marble pyramid of Constantine Porphyrogennetus, the Colossus Structilis of the old topographers, does not at present fairly stand on the At-meidan, though it is near it and visible from it: it has long been stripped of the plates of gilded bronze that once covered it; the shaft is held together by rude iron hoops, and blackened by the many conflagrations that have raged round it. It is now an unsightly object, about 90 feet in height, and 33 in circumference.

Many of the mosques erected by the Turks are distinguished by grandeur and beauty. There are fourteen chief or imperial mosques, nearly all lofty, and magnificent in their general dimensions, and built from base to dome of excellent enduring materials, chiefly of white marble, slightly tinged with grey. Some of these have two, some four, and one (that of Sultan Achmet) has even six of those light, thin, lofty, arrowy, and most graceful towers called minarets. Besides the imperial mosques, there are 60

others, varying in size and beauty, but all considerable edifices; and then 200 and more small mosques or messelgids, which are only distinguished as places of worship by having little minarets, often made of wood, contiguous to them. The mosque which has been most talked of, because it was antiently a Christian temple, and was supposed (we think erroneously) to have suggested to the Turks the grand dome or cupola which predominates in all the great mosques they built themselves, is that of Santa Sophia. Several of the imperial mosques, however, in situation, boldness, and beauty, far excel Santa Sophia, which, externally, is rendered hideous by the clumsy buttresses that have been built against it, at different periods, to keep it from falling. If the Turks really copied the dome from it, they have improved on the original, which is comparatively low and heavy, whilst most of their cupolas are lofty, light, and elegant. This is particularly the case with the mosque of the Sultan Achmet, which flanks the Hippodrome, and which may be deemed altogether the grandest edifice in Constantinople. The colleges and hospitals, which are generally attached to or near the great mosques, offer no striking architectural features; but some of the detached chapels or sepulchres (*turbé*), where sultans, viziers, and great personages repose, are handsome. The spacious barracks erected by the reigning Sultan Mahmoud for the accommodation of his *Nizam-djedid*, or troops disciplined in the European manner, may be reckoned among the public ornaments of the city and suburbs.

The public baths, of which there are said to be upwards of 120 within the walls, with their very low and small and flat domes, do not contribute to the beauty of the city externally, though within many of them are exceedingly handsome and spacious. The public fountains are remarkable and numerous: some of them, with their pure white marble façades, elaborate arabesque ornaments and Chinese roofs, are most beautiful objects. All this water, the daily consumption of which is immense, is supplied by *Bendts* or artificial lakes in or about the forest of Belgrade, at the distance of ten or twelve miles from the city: it is conveyed to Constantinople, as also to the suburbs of St. Dimitri, Pera, Galata, &c. by means of narrow subterranean aqueducts, and *souterazi*, or hollow hydraulic pyramids, which latter are placed at certain irregular distances, and so contrived as to overcome the inequalities of surface presented by the country that intervenes between the bendts and the city. Within the walls the lofty aqueduct of Valens still performs its duty, carrying the fluid across a deep hollow.

With the exception of one very long street, which traverses the city nearly from the high walls of the seraglio to the gate of Adrianople, the streets are narrow, winding, and uncommonly dull and deserted. The *gazeboo* or *shah-nishins* (projecting windows) are latticed and closed like the windows of convents; and many of the houses have no windows at all towards the street, but only a low, narrow, dingy door. All the life and activity of the interior of the city is concentrated in the bazaars or bezestines. These are long wide corridors, communicating with each other mostly in an irregular and striking manner; their side walls are built of stone, and they are covered in with stone arches or successions of domes, through which a subdued light is admitted. The dealers are separated by nations or religions and by trades. [BAZAAR.] Towards the evening the coffee-houses, which are excessively numerous, though chiefly of mean appearance and dimensions, are much thronged by Turks, Armenians, Greeks, and Jews, all smoking and indulging in tiny cups of coffee, which is generally drunk by the poorer classes, not only without milk, but without sugar.

The communication between the city and the opposite suburbs of Galata, Pera, and Tophana, is kept up by means of *caïks*, or light fast wherries, the constant passing and repassing of which give the port an animated appearance in the day-time. The imperial dock-yard, the arsenal, the artillery barrack, are on that side of the water, and the elevated plateau of Pera is the residence of the foreign ambassadors to the Porte, the drogomans, Frank merchants, &c. An active communication is also kept up by the same means with Scutari, where caravans and travellers are constantly arriving from Ismmid (Nicæa), Brusa (Prusa), Angora (Ancyra), and other places in the interior of Asia Minor

The port of the Golden Horn is safe, capacious, and beautiful; but it has one serious drawback, which affects Constantinople as a commercial emporium. During the summer, the Etesian or north wind blows unremittingly from the Black Sea down the Bosporus, the sea of Marmora, and Straits of the Dardanelles, thus retarding the approach of all sailing vessels from the Mediterranean and Ægean to the capital. Vessels undertaking the voyage upwards at that season are often detained two or even three months at Tenedos, on the coast of Troy, near the mouth of the Dardanelles, where whole fleets of wind-bound ships, laden with goods for the capital or the Black Sea, are frequently at anchor. This serious obstacle can only be overcome by steam-vessels, which are now well known and on the increase in the Sultan's dominions. The first that ever appeared in those narrow seas was a large English boat, purchased by the Turkish government in 1828. The Sultan has bought two others since then, and there are two or three belonging to companies of merchants that trade from Smyrna and the Greek Islands. In no part of the world can the usefulness of such vessels be more felt.

As a manufacturing town, Constantinople scarcely deserves mention; pipes and pipe-sticks, muslin handkerchiefs painted and embroidered, costly saddlery, and horse-trappings, are the principal articles produced. The foreign trade, however, is very considerable. In the articles of exports it is made the depôt of raw silks and opium, which are now not allowed to be shipped at any other port. It imports manufactures, colonial and other goods, not only for its own large population, but for a considerable portion of both European and Asiatic Turkey. The impoverishment of the people and the insecurity of property render nugatory many wise regulations, and prevent the growth of commerce, which might be tenfold what it actually is. The Turks have never loaded trade with heavy duties or jealous prohibitions: their code extends immunities and high consideration to merchants; but unfortunately these immunities are not enjoyed by the consumers, or by any class, and the cultivator of the soil is the helpless victim of the extortion and tyranny of the government officers. [TURKEY, COMMERCE OF.]

We have no census or official data, but the population contained within the walls of Constantinople is probably about 500,000. It is usual, in the country, to speak of 'the million of Stambool,' and to add the population of Pera, Galata, St. Dimitri, Scutari, and the numerous villages on the Bosporus; but we question whether all these would carry the number higher than 700,000 or 800,000, comprising Turks, Greeks, Armenians, Jews, and Franks.

A city stood here in remote antiquity; but if (as there are good grounds for believing) the extent of Byzantium is marked by the present walls of the Seraglio, it was a small one. [BYZANTIUM.] The present enlarged city was founded in A.D. 328 by the Emperor Constantine, who gave it his name, enriched it with treasures of art taken from all parts of the Roman world, and soon made it the rival of Rome itself. It was taken from the degenerate Greeks in 1204 by 'the blind old Dandolo,' the Venetians, and the French, who attacked it on the side of the port. After remaining fifty-seven years in the hands of the Franks, it was retaken by the Greeks in 1261 under the Emperor Michael Palæologus. It was conquered by the Turks in 1453.

CONSTANTI'NUS, FLA'VIUS VALE'RIUS, called the Great, the son of Constantius Chlorus, was born in 274. He was brought up at the court of Diocletian, and served early with the armies in various expeditions. Being in Britain at the time of his father's death, he was proclaimed emperor by the soldiers, but he prudently referred his nomination to Galerius, who acknowledged him only as Cæsar, and governor of the provinces which had long been administered by his father. Constantine passing over into Gaul to oppose the Franks who had entered that province, defeated them as well as the Alemanni, and behaved with great inhumanity to the prisoners; he gave up their chieftains to the wild beasts as a public spectacle. (Eutropius, x.) Meanwhile Maxentius, the son of Maximianus, caused a revolt at Rome while Galerius was absent in the East, and Maximianus himself having come to Rome, resumed the title of emperor, and took Maxentius as his colleague. Severus, whom Galerius ordered to put down this insurrection, was betrayed by his troops, taken prisoner, and put to death by Maximianus. The latter however fearing the vengeance of Galerius, thought of strengthening himself by an alliance with Constantine, whom he went to meet in Gaul, and gave

him his daughter Fausta in marriage. From that time Constantine was acknowledged as Emperor by the West. Soon after Maximianus having quarrelled with his son Maxentius, left Rome for Pannonia, where he met Galerius and Diocletian, who had left his retirement of Salona for the purpose of appointing Licinius a new Cæsar, in the room of Severus. There were then in the empire no less than six emperors and Cæsars, namely, Maximianus, Maxentius, Galerius, Constantine, Maximinus and Licinius. Galerius soon after acknowledged both Constantine and Maximinus, as emperors and Augusti equal to himself. Maxentius continuing to maintain himself at Rome, Maximianus visited his son-in-law Constantine, whom he attempted to dispossess of his authority by exciting his soldiers to revolt, but he was defeated and taken at Massilia by Constantine, who treated him with great indulgence, and allowed him to remain in his palace. Maximianus having next attempted to murder him in his bed, was seized and put to death. In the year 311 Galerius published an edict to stop the persecution against the Christians; this document bears the name of three emperors, Galerius, Constantine, and Licinius: Maximinus, who was in Asia, is not mentioned in it. Galerius soon after dying at Sardica in Dacia, Licinius took possession of his dominions as far as the Hellespont, and Maximinus had the whole of Asia. Maxentius continued to govern Italy, and was making warlike preparations against the other emperors, when Constantine moved with an army from Gaul to attack him, A.D. 312. He took Susa, defeated several bodies of troops sent against him by Maxentius, entered Mediolanum (Milan), and then attacked Verona, where Pompeianus, a general of Maxentius, had stationed himself. After an obstinate fight, Pompeianus was defeated and killed, and Constantine marched upon Rome, where he defeated Maxentius in person, a few miles from the capital, on the right bank of the Tiber, near the present Ponte Milvio, where Maxentius had constructed a bridge of boats. In recrossing the bridge in his flight, Maxentius was drowned, with many of the fugitives. Constantine entered Rome on the 29th of October, and was acknowledged emperor by the senate, who ordered the Triumphal Arch which still exists to be raised to him as the liberator of Rome. He is said to have behaved with moderation after his victory, having put to death only a few of the worst ministers of Maxentius, who is represented as a cruel tyrant both by Heathen and Christian historians.

It was on this occasion that Constantine adopted a new ensign for his army, which was called Labarum or Laborum; it had the figure of a cross, with the Greek letter P above it, and the Greek words ἐν τούτῳ νίκα, 'conquer in this.' Eusebius, who gives a description of it, asserts with other Christian historians, that it was assumed in consequence of a vision which Constantine had before his battle with Maxentius. Gregorius Nazianzenus says, that the name of Laborum was used as indicating that by the assistance of this new sign all 'labours' and tribulations of the empire should cease. Zosimus, Aurelius Victor, and Eutropius, say nothing of it. Much has been written on this subject. (See Gretser, *De Cruce:* and *Dissertation sur la Vision de Constantin*, par J. B. Devoisier, Bishop of Nantes.)

In the year 313, Licinius came to Rome, when both he and Constantine were named consuls, and he married Constantia, the sister of Constantine. The old emperor Diocletian died in July of that year at Salona.

A war having broken out in the East between Licinius and Maximinus, the latter was defeated, and died of poison at Tarsus: all his family were put to death by Licinius. The whole empire was now divided between Constantine, who ruled over the west, including Italy and Africa; and Licinius, who had the eastern provinces, with Egypt.

Constantine now openly favoured the Christian communion, and discountenanced and ridiculed the practices of the old religion of Rome. He exempted the Christian clergy from personal taxes and from civil duties, and granted donations and privileges to the churches. He ordered a council of the bishops of the west to assemble at Arles to settle the schism of the Donatists, and went himself to Arles; but while there he received news of the hostile intentions of Licinius, which made him march in haste at the head of an army into Illyricum. The two armies met near Sirmium in Pannonia, and again in the plains of Thrace, after which Licinius sued for and obtained peace, by giving up to Constantine Illyricum, Macedonia and Greece. On visiting these new provinces, Constantine promulgated several laws, by which he abolished the punishment of the cross, ordered that the children of destitute parents should be maintained at the public expense, and allowed the emancipation of slaves to be effected in the Christian churches in presence of the clergy without any interference of the civil magistrate. By another law, promulgated at Sardica in December, 316, he gave to the vicars or governors of the provinces full power to try persons of every rank accused of oppressions and robbery, without any appeal to Rome, by which he put a check on the overbearing insolence of the rich towards the poor. In the year 318, Crispus, son of Constantine by his first wife, obtained the consulship with the younger Licinius, the son of Licinius. Constantine spent several years in visiting the provinces of the empire, and promulgating new laws, which were conceived for the most part in a humane and liberal spirit: he abolished the punishment of flagellation formerly inflicted on defaulters in the payment of taxes, introduced a better discipline into the prisons, repealed the old laws against celibacy, and forbade concubinage, which was then allowed by the Roman laws. He also prohibited nocturnal assemblies, and certain obscene rites of Paganism; but he did not attempt to forbid the exercise of the old religion.

By an edict of March, 321, he ordered the observance of the Sunday, and abstinence from work on that day. In the year 322 he defeated the Sarmatians and the Getæ or Goths, and repulsed them beyond the Danube. On returning to Thessalonica, where he was constructing a harbour, the Goths appeared again, and invaded Mæsia and Thrace. Constantine again attacked them, and pursued them into the territories of Licinius. This was made the pretence of a new war between the two emperors, in which Licinius being defeated near Chalcedon, by sea and by land, escaped to Nicomedia, and there surrendered to Constantine, who, at the intercession of his sister Constantia, promised him his life, and sent him to Thessalonica, where however he was soon after put to death, A. D. 324. Licinius has been spoken very unfavourably of by most historians. Constantine, being now master of the whole empire, extended to the east his laws in favor of the Christian religion. He forbade consulting the haruspices and the oracles, ordered the churches of the Christians which had been demolished under Maximinus and Licinius to be rebuilt, and the property of the church to be restored, and more especially the burial grounds of the Martyrs; and reinstated in their rank and right all those who had been prosecuted or exiled for religion's sake. In writing to the Metropolitans he styled them 'well-beloved brethren.' He published a Latin edict, which was turned into Greek by Eusebius, addressed to all the subjects of the empire, in which he exhorted them to renounce their old superstitions, and to adore only one God, the Saviour of the Christians. In 325 he assembled the first universal council of Nicæa, which he attended in person. [ARIUS.] On the 25th July of that year, being the anniversary of his accession to the empire, he gave a great entertainment to all the fathers of the council, to whom he gave considerable gifts and sums to distribute to the poor. From Nicomedia, where he resided for some time, he issued an edict inviting all the subjects of the empire to address their complaints to him in person against any abuse of authority of the governors and magistrates. By another edict he abolished the fights of gladiators, and ordered that the convicts, who were formerly compelled to fight against them or against the wild beasts, should be employed in working the mines. These facts show a great alteration in Constantine's mind from the time when he himself gave up the Frankish prisoners to the wild beasts in the amphitheatre.

In the year 326 he repaired to Milan, and then to Rome, being consul, for the seventh time, with his son Constantius; he remained at Rome but a short time, and left it in disgust, never to return to it. According to Zosimus and Libanius the Romans were dissatisfied with him for having forsaken the old religion, and expressed their discontent by biting satires. By the end of the year we find Constantine at Sirmium, in Pannonia. In this same year is recorded the tragical death of Crispus, the eldest son of Constantine, by a former wife or concubine, a young man who had been educated by Lactantius, who has been praised by Eusebius, and who had given proof of his courage and abilities on many occasions. He was falsely accused by his step-mother, Fausta, of having endeavoured to seduce her, some say of having aspired to the

sovereign power, and upon either of these charges his father had him beheaded: at the same time he put to death young Licinius, his sister's son, the motive for which is not ascertained. But it was soon after discovered, some say through Helena, the mother of Constantine, that the young prince was innocent, and that Fausta herself had been repeatedly guilty of adultery, upon which she also was put to death with several of her accomplices. Constantine's suspicious temper added to the number of the victims.

About the year 328 Constantine began to build his new capital, which was called by his name, and the spot was judiciously chosen. It was a Christian city, chiefly inhabited by Christians, and no Heathen temples were built in it. In May, 330, the new town was solemnly dedicated to the Virgin Mary. Meantime the emperor was repeatedly engaged against the Goths and other barbarians on the banks of the Danube. In the year 328 he recalled several Arian bishops, Eusebius of Nicomedia among others, who had been exiled by the council of Nicæa. This change is said to have happened at the suggestion of Constantia, who was herself in the Arian communion, and retained to the last much influence over her brother Constantine. Athanasius having opposed the re-admission of the Arians into the church communion, this led to a long controversy between him and the emperor, which lasted till the death of the latter. [ATHANASIUS.] Constantine was fond of religious polemics, and himself wrote on the Arian and Donatist controversy. The remaining years of Constantine's life were chiefly spent in embellishing his new capital and attracting inhabitants, especially Christians, to it; the rich by privileges, the working men by daily distributions of corn and oil. He made a division of the empire, to take effect after his death, among his three sons, whom he had named Cæsars, giving to Constantine the eldest, the Gauls, Spain, and Britain; to Constans, Illyricum, Italy, and Africa; and the east to Constantius. To Dalmatius, one of his nephews, he gave Macedonia and Achaia, and the other, Annibalienus, he made king of Pontus and Cappadocia. He likewise divided the authority of the præfect of the prætorium among four præfects, of the East, of Macedonia and Dacia, of the Gauls, and of Italy. These four great governments were subdivided into provinces, administered by vicars or proprefects. He took away from the præfects all military power, constituting them merely as civil and political officers. He is charged by Zosimus, who is strongly biassed against Constantine, with having effected another change which proved fatal to the empire, namely, the removal of the military stations on the frontiers, and the placing of the soldiers in garrison in the towns of the interior; but perhaps this was only on some particular points, where the barbarians had encroached and were likely to cut off the old border stations. We find that he gave lands in Thrace and other provinces south of the Danube to the Sarmatians, who had been driven from their country by the Goths. Constantine probably thought of making one race of barbarians a rampart to the empire against the other. In the year 337, when preparing to march against the Persians, who had commenced hostilities, he fell ill at Nicomedia, and died, in his sixty-fourth year. He is said to have received baptism on his death-bed from an Arian bishop; for although long converted to Christianity he was still only a catechumen, as was frequently the case with converts in that age. His body was transferred to Constantinople, where it was buried, after a sumptuous funeral. The senate of Rome placed him among the gods, and the Christians of the East reckoned him among the saints: his festival is still celebrated by the Greek, Coptic, and Russian churches, on the 21st of May.

The character of Constantine has been the object of various and contradictory judgments, according to the religious and political spirit of the various writers. Eusebius, Nazarius, and other Christian contemporaries, grateful for the protection afforded by the emperor to the Christian religion, may be considered his panegyrists, while Zosimus and other Heathen writers, animated by an opposite feeling, were his enemies. The brief summing up of Eutropius is perhaps nearest the truth. 'In the first part of his reign he was equal to the best princes, in the latter to middling ones. He had many great qualities; he was fond of military glory, and was successful. He was also favourable to civil arts and liberal studies; fond of being loved and praised, and liberal to most of his friends. He made many laws; some good and equitable, others superfluous, and some harsh and severe.' He has been blamed for dividing the empire, but that had been done already by Diocletian; in fact it was too large and straggling to remain in the possession of a single dynasty. By founding another capital in the east he probably did not accelerate the fall of the west, while at the same time he established a second empire, which lasted for more than a thousand years after his death. (Eusebius, *Life of Constantine*; Zosimus; Aurelius Victor; Eutropius, and other numerous writers, a list of whom is given by J. Vogt; *Historia Litteraria Constantini Magni*, 1720.)



[Coin of Constantine the Great.]
British Museum. Actual size. Gold. Weight 70 grains.

CONSTA'NTIUS I., called **CHLORUS**, on account of his habitual paleness, son of Eutropius, of a distinguished Illyrian family, and of Claudia, niece of the Emperor Claudius II., was born about A.D. 250. He served with distinction under Aurelian, Probus, and Diocletian. In the year 291, Maximianus, the colleague of Diocletian, named him Cæsar and his colleague, while Diocletian chose on his side Galerius: the administration of the empire was divided among the four. Constantius had for his share the Gauls, Spain, and Britain. Both the new Cæsars were obliged to repudiate their wives. Constantius, whose first wife was Helena, the mother of Constantine, married Theodora, daughter of Maximianus; Galerius married Valeria, daughter of Diocletian. Constantius carried on war against the Franks, who began to be troublesome on the Lower Rhine, and took a vast number of them prisoners. He restored the town of Augustodunum (Autun), which had been devastated by Tetricus, one of the thirty tyrants. He then repaired to Britain, with Asclepiodotus, one of his lieutenants, who defeated Allectus (A.D. 300) the successor of Carausius in the usurped dominion of the island. Britain was thus restored to the empire after a revolt of ten years. On his return to Gaul, Constantius went against the Alemanni, whom he defeated with great slaughter near Vindonissa in Helvetia, some say near Langres, and drove them beyond the Rhine. About this time he founded the town of Constantia (Constanz). In the year 304 the two emperors, with the two Cæsars, came to Rome, where they enjoyed the honour of a triumph. In the following year Diocletian and Maximianus abdicated, and appointed Constantius and Galerius their successors, who in their turn appointed two new Cæsars as their colleagues, namely Severus and Maximinus Daia, or Daza. Constantius continued to administer his old government of Gaul, Spain, and Britain. His administration, which was equitable and humane, is greatly praised by the historians, both Christian and heathen. He put a stop to the persecutions against the Christians, and employed many of them about his person. The last campaign of Constantius was against the Caledonians, some say against the Picts, whom he defeated. He died soon after at Eboracum (York) in the arms of his son Constantine, whom he appointed his successor A.D. 306. By his second wife Theodora, Constantius left several children, Dalmatius, Julius Constantius, who was the father of Constantius Gallus and of Julian the Apostate, and Constantia, afterwards married to Licinius.



[Coin of Constantius.]
British Museum. Actual size. Copper, silvered. Weight 116 grains

CONSTA'NTIUS II., FLAVIUS JULIUS, son of Constantine the Great, was left, by his father's will, emperor

of the east. The troops, however, in order to secure the empire to the three sons of Constantine, killed Julius Constantius, half-brother of the late emperor, Dalmatius and Annibalienus, his nephews, and other of his relatives, with several patricians and ministers. This massacre was allowed by Constantius, and some say was ordered by him; only two nephews of Constantine escaped, Gallus and Julianus, afterwards emperor. Constantius was repeatedly engaged in war against the Persians and the Armenians, but with little success on his part. Ammianus Marcellinus, in speaking of these wars, says that the Romans were successful when led by the emperor's lieutenants, but were generally losers when led by the emperor in person. After the death of Constans, A.D. 350, Constantius marched with a large force against Magnentius to revenge his brother's death, and at the same time to take possession of his dominions. A desperate battle was fought, A.D. 351, near Mursa, on the banks of the Drave, and at last the cavalry of Constantius gained the victory. Magnentius escaped into Italy, but Constantius was too much weakened by his victory to follow him until the next year, when he entered Italy, defeated Magnentius again, and obliged him to escape into Gaul. In the year after, 353, Constantius again defeated Magnentius in Gaul. The usurper, finding himself forsaken by his soldiers, killed himself, and his brother Decentius, whom he had made Cæsar, followed his example. Constantius now became master of the west as well as of the east, and thus reunited the whole empire under his dominion. He had appointed his cousin Gallus Cæsar and governor of the east, when he set out to oppose Magnentius. In the same year, 353, Constantius assembled a council at Arles, which was composed of Arian bishops. The emperor favoured that sect, and persecuted the orthodox or Nicæans, and exiled many of their bishops, among others Liberius, bishop of Rome. In the year 354, Constantius, having received repeated complaints of the cruelties and oppressions committed by Gallus in the east, sent for him and caused him to be beheaded in Dalmatia. Several conspiracies were also discovered or invented by the courtiers of Constantius, and numerous persons tortured and put to death. Meantime the Franks and the Alemanni had passed the Rhine, and destroyed Colonia (Cologne) and other towns; the Quadi and the Sarmatians were ravaging Pannonia, and the Persians attacked the eastern provinces. It was in this emergency that Constantius, being at Milan in November, 355, proclaimed his cousin Julian Cæsar, gave him his sister Helena in marriage, and sent him as commander to the Gauls. In the following year Constantius issued laws forbidding under pain of death any sacrifice to idols, and condemning to death all magicians, astrologers, and soothsayers. In 357 the emperor repaired to Rome for the first time, and was received with great pomp by the senate, and public festivals and games were celebrated in his honour. He caused the obelisk which Constantine had removed from Heliopolis to Alexandria, to be carried to Rome, where it was raised in the Circus Maximus: it was now called the Lateran Obelisk. Constantius having returned to the east, defeated the Sarmatians, while Julian conquered the Germans on the Rhine. He then marched against the Persians, but was unsuccessful. In the mean time Julian had been proclaimed emperor by the soldiers at Paris. Constantius was making preparations to attack him, when he was taken ill at Tarsus, and died, A.D. 361. On his death-bed he named Julian his successor. Constantius, though not a good prince, had yet some valuable qualities. He was cautious and discriminating in the appointment of his great officers; he took care of the soldiers; he bestowed office generally on the most deserving; was fond of science and application, was temperate, sober, slept little, and his habits were regular. But he was suspicious, and cruel in consequence of his suspicions. He oppressed the people with taxes and spent much money in pomp, parade, and useless building. (Ammianus, b. xiv.)

CONSTANZ, also Costnitz, the capital of the Baden Circle of the Lake, is on the left or southern bank of that part of the lake of this name, where the Rhine begins to form the Untersee; in 47° 36′ N. lat., and 9° 10′ E. long. It is fortified in the old style, with a high wall flanked by towers and a broad ditch, besides bastions on the western side and the side of the lake. Kreuzlingen, one of its suburbs, separated from it by a ditch, is defended by two bastions; and Petershausen, which lies on the other side of the strait that connects the Bodensee and Untersee, is united to Constanz by a covered wooden bridge, on which there are grinding and sawing mills. In this last suburb is the castle of Petershausen, a fortress the works of which have been converted into pleasure grounds. There is a third suburb, called Paradise, in which Huss the reformer, and Jerome of Prague, his brother-reformer, were burnt, and which may now be termed the nursery grounds and orchard of Constanz. The most remarkable buildings in the town are the cathedral, which contains a magnificent high altar, some fine mosaic pavements, &c., and the church of St. Stephen; the antient Minorite or Dominican monastery, now a cotton factory, with the tower in which John Huss was confined; the Kaufhaus or mart, once a Carthusian monastery, built in 1388, which contains the hall where the council sat (1414-18), which deposed three popes, and condemned Huss and Jerome of Prague to the stake; the old Dominican monastery on the island of Genf, in which are the tomb and epitaph of Emanuel Chrysoloras, who died here in 1415, &c. Constanz is the seat of various official departments, and has a lyceum, gymnasium, hospital, and Dominican nunnery for the education of young females. It contains about 930 houses and 5600 inhabitants, a sad decrease since the fifteenth and sixteenth centuries, when the population was from 25,000 to 30,000. Indeed it is now a lonely deserted place, and the grass is growing in the streets. The chief occupations are trade, fisheries and navigation, the cultivation of vineyards and gardens, brewing, and some few manufactures. Constanz is one of the oldest towns in Germany, and previously to the fourth century bore the name of Gannodorum. [CONSTANTIUS I.] It was formerly a free imperial town, but fell under the ban of the empire in 1548, and in 1549 was annexed to Austria, which ceded it to Baden in 1810.

CONSTANZ, or CONSTANCE, a large lake, called also the Bodensee (from the antient castle of Bodmann) or the lake of Costnitz, forms part of the south-west boundary of Germany on the Swiss side, and is the common property of the several states on its banks, namely, Austria, Bavaria, Würtemberg, Baden, and Switzerland. It lies between 47° 28′ and 47° 48′ N. lat., and 9° 2′ and 9° 44′ E. long. It is 1283 feet above the level of the sea: its greatest length, from Bregenz to Bodmann, is about forty-five miles; its greatest breadth, between Rorshach and Friedrichshafen, is about thirteen miles, and its average depth is 320 feet, the greatest being 964. The entire lake occupies an area (exclusive of the islands) of about 199 square miles, of which about twenty-two belong to the Zellersee. It is divided into the Upper and Lower Lakes, of which the Upper, which is by far the most considerable, extends from Bregenz to Constanz. The Lower Lake is subdivided into Lake Zell or Zellersee, which is about sixty feet deep, contains the fertile island of Reichenau, belonging to Baden, and into what is properly called the Lower Lake (Untersee), through which the Rhine flows. The northernmost bight, which contains the island of Meinau, also belonging to Baden, and the island of Lindau, is called Lake Bodmer, or the Ueberlingersee. The Rhine enters the lake at Rheineck, and leaves it at Stein. Above fifty larger and smaller streams, such as the Bregenz, Schuszach, &c., empty themselves into Lake Constanz. It was frozen over in 1477, 1572, 1695, and 1830. It has on several occasions been subject to sudden risings of the waters. In 1549, according to Dr. Stein, it rose four or five times in one hour to the height of an ell, or upwards of two feet above its ordinary level; in 1770 it rose in one hour from twenty to twenty-four feet above the ordinary level. There is a considerable traffic on the lake in corn, timber, cattle, wine, fruit, &c., but it is rather dangerous, from being subject to sudden squalls; the navigation is besides impeded by the fall of the Rhine at Schaffhausen. It contains seventy-three kinds of aquatic and marsh fowl, twenty of shell-fish, and twenty-six of fish, particularly salmon-trout, pikes, carp, and salmon; the latter however is not the true salmon, but the *Salmo murena*. The wine, called lake-wine, grown along the lake, is rough, but becomes excellent when old. The Lake of Constanz and its environs present the most varied and picturesque scenery in Germany. It is mentioned by antient writers under the name of Lacus Brigantinus; Pliny expressly assigns it to Rhætia; others reckon it part of Vindilicia. It bore other names, such as Rheni Lacus, Suevicus L., in addition to Brigantinus L., from the Brigantii who dwelt on its banks. Tiberius built a fleet on it in order to attack the Vindilici. (Strabo, vii. 292.)

CONSTELLATION (a putting together of stars), the name of one of those groups of stars into which the whole heavens are divided, and to each of which is imagined to belong the figure of a man, an animal, or some other object, natural or artificial.

The history of the constellations is a matter of mythological antiquity, the most curious features of which are connected with the twelve signs or constellations of the ZODIAC, or the sun's apparent yearly track. It is sufficient for us here to say, that it is certain we derive our constellations for the most part from the Greeks, and that it is nearly as certain that they derived them from the East, though it is highly probable that they altered the legends to suit their own mythology, and in some instances even the figures. Their firmament, if it confined itself to recording the vast and striking events of their mythic system, as in Argo or Hercules, might bear an external presumption of originality, which it wants altogether while so prominent a constellation as the Great Bear represents nothing but the unimportant and irrelevant story of Callisto. But while we are just in possession of sufficient knowledge to deny the original formation of the constellations to the Greeks, and perhaps even to the Egyptians, we have not enough to say in what nation they were first constructed.

The method of figuring the constellations, though in many instances it gives groups which are striking to the naked eye, is one of the worst which could have been invented for the modern purposes of astronomy. A dragon winding round three-quarters of the globe, and a man extending his arms and legs between half a dozen other figures, cannot connect their included stars in any manner which will lead to useful combinations. So that in our modern catalogues, though λ Draconis and *z* Draconis are said to be in the same constellation, the connection is purely one of names, and suggests no ideas of relative position. There are even instances in which stars bearing the name of one constellation are situated in another.

We shall proceed to describe the methods by which the stars in a constellation are distinguished, and the plan we have adopted in the present work. The letters of Bayer are generally adopted for all the stars in his maps. The stars were ranged by him in order of brilliancy, as they appeared to the naked eye about A.D. 1600. The Greek letters were first used, and afterwards the Italic small letters. Thus α is the most brilliant star in a constellation according to Bayer, while *p*, *q*, &c. are comparatively faint. Other astronomers have since carried on the lettering of Bayer, and we have latterly (in this work) distinguished the letters added since Bayer's time by parentheses in all those constellations which were partly lettered by Bayer and partly by others. But in all cases the extent of Bayer's letters may be ascertained by reference to the article headed by his name. The letters had been adopted, however, previously to Bayer. [PICCOLOMINI.]

The next step in the arrangement was that of Flamsteed, who retained the old method of describing stars by their situation in the figure of the constellation (as in the leg, in the head, &c.), but placed the stars of each constellation in order of right ascension, or in the order in which they come on the meridian. Succeeding astronomers described each star by the number which it stood from the beginning in the constellation, and called it Flamsteed's number. Thus 7 Draconis means that star of Draco which comes on the meridian the seventh of all the stars observed by Flamsteed in that constellation. Mr. Baily, in his new edition of the British Catalogue, has introduced new stars from Flamsteed's papers, but has allowed them to stand without disturbing the established numbering, and they are easily identified by the general numbering of the new catalogue. Thus, there is a star in Capricornus between 12 Capr. and 13 Capr., which may be described as 2786 of Mr. Baily's edition, that is, the 2786th from the equinox of 1690 of *all* the stars observed by Flamsteed, both of those which are in the British Catalogue of A.D. 1725 and those which have been since drawn from Flamsteed's papers.

The numbering of Piazzi is on a different and inferior principle. The whole heavens being divided into twenty-four hours of right ascension, the stars are numbered in their respective hours of right ascension. For instance, (303) Can. Maj. is, according to Piazzi, a star in Canis Major, not the 303rd of that constellation, but the 303rd of the hour of right ascension in which it fell in the year 1800, counting the first star of the catalogue which passed after the sidereal clock had marked the hour as 1, the second star as 2, &c., and affixing to each the name of the constellation in which it is. If the equinox were fixed, this method would be a good first correction of the vagaries of the constellations; but as it is, some stars which were in one hour of right ascension when Piazzi formed his catalogue are now in another, such as 12 Cancri, 15 Argus, &c., which were in 1830 on the borders of the 7-8 hour of right ascension.

In most other catalogues, such as those of Bradley, Lacaille, Mayer, Fallows, &c., the stars are usually numbered in their order from the beginning of the catalogue, the order being that of right ascension.

The Astronomical Society's Catalogue (published in 1827) is the basis of the enumeration of stars contained in this work. It professes to be a reduction to the year 1830 of all the stars of the following description which were observed by Flamsteed, Bradley, Lacaille, Mayer, Piazzi, and Zach; to which a few of Fallows' additions to Lacaille are joined. The whole list contains—

1. All the stars to the *fifth* magnitude inclusive, wheresoever situated.
2. All the stars to the *sixth* magnitude inclusive, situated within 30° of the equator.
3. All the stars to the *seventh* magnitude inclusive, situated within 10° of the ecliptic.

Bayer's letters and Flamsteed's numbers are both given where they exist. Where these are not found, *Piazzi's* numbers are given in *parentheses*, ( ), and where these are not found, *Bradley's* numbers in *brackets*, [ ]. Failing all these, we see Zach's numbers (with Z annexed) or Lacaille's (with C), or Fallow's (with Fa.) All Mayer's stars (some excepted, which have not been found again) are in Piazzi. The number in the catalogue itself (reckoning from the beginning) is in a separate column. The magnitudes are from Mr. Baily's Flamsteed so far as they go, and where that fails, from the catalogue.

The recognised makers of constellations are Aratus, Ptolemy, Bayer, Hevelius, and Lacaille. But Tycho Brahé, Lemonnier, and Poczobut have each added one constellation in the following list, and Halley two. The names without any letter are all in Aratus. (Remember, however, that Libra is only the *claws* of the Scorpion, both in Aratus and Ptolemy.) [LIBRA.] Three additional ones in Ptolemy's Catalogue are denoted by P.; Bayer's by B.; Hevelius's by H.; Lacaille's by L.; Tycho Brahé's by T.; Halley's by Ha.; Lemonnier's by Le.; and Poczobut's by Po.

Andromeda.	Crux, Ha., or by Royer,	Norma, L.
Antlia Pneumatica, L.	from Halley's observations.	Octans, L.
Apparatus Sculptoris, L.		Ophiuchus.
Apus*, B.	Cygnus.	Orion.
Aquarius.	Delphinus.	Pavo, B.
Aquila.	Dorado, B.	Pegasus.
Ara.	Draco.	Perseus.
Argo.	Equuleus, P.	Phenix, B.
Aries.	Equuleus Pictoris, L.	Pisces.
Auriga.	Eridanus.	Piscis Australis.
Bootes.	Fornax, L.	Piscis Volans, B.
Cælum Scalptoris, L.	Gemini.	Pixis Nautica, L.
Camelopardalus, H.	Grus, B.	Reticulus, L.
Cancer.	Hercules.	Sagitta§.
Canes Venatici, H.	Horologium, L.	Sagittarius.
Canis Major.	Hydra.	Scorpius.
Canis Minor, P.	Hydra et Crater†.	Serpens.
Capricornus.	Hydrus, B.	Sextans, H.
Cassiopeia.	Indus, B.	Solitarius, Le.
Centaurus.	Lacerta, H.	Taurus.
Cepheus.	Leo	Taurus Poniatowski, Po.
Cetus.	Leo Minor, H.	Telescopium, L.
Chamæleon, B.	Lepus.	Triangula‖.
Circinus, L.	Libra.	Triangulum Australe, B.
Clypeus Sobieski, H.	Lupus.	Tucan, B.
Columba, Ha.	Lynx, H.	Ursa Major.
Coma Berenices, T.	Lyra.	Ursa Minor.
Corona Australis, P.	Microscopium, L.	Virgo.
Corona Borealis.	Monoceros, H.	Vulpecula (et Anser),
Corvus.	Musca‡, B.	H.

There are many other constellations formed by different individuals; but these are not now generally admitted. Such are the Antinous of Tycho Brahé; the Mons Mænalus and Cerberus of Hevelius; the Oak of Charles II. and the Cor Caroli of Halley; the Table Mountain and the Nubecula Major and Minor of Lacaille (the latter being not clas-

* The Avis Indica of Bayer. [Correct *Apis* Indica in BAYER.]

† Crater is a separate constellation in Ptolemy. The neighbouring stars on the body of Hydra were considered by Flamsteed as part of this constellation.

‡ This is the Apis of Bayer, called Musca by Lacaille: there is however a constellation Musca, formed by Bode, we believe, and situated close to Aries, the stars of which are usually considered as belonging to Aries.

§ A part of Aquila in Aratus.

‖ Only one in Aratus and Ptolemy. Another added by Hevelius.

ters of distinct stars, but large nebulæ); the Reindeer of Lemonnier; the Reaper of Lalande; the Honours of Frederic, the Sceptre of Brandenburgh, Herschel's Telescope, the Balloon, the Mural Quadrant, the Cat, and the Log Line of Bode; and George's Harp of Hell. Many others, we believe, have been proposed, but there would be little use in reviving their names. In fact, half a century ago, no astronomer seemed comfortable in his position till he had ornamented some little cluster of stars of his own picking with a name of his own making.

In the large maps of the stars, published by the Society for the Diffusion of Useful Knowledge, the constellations are figured precisely as described by Ptolemy, and the additional ones are not drawn, which will therefore render them useful to the readers of Greek astronomical works.

CONSTIPATION, an undue retention or an imperfect evacuation of the fæces. The alimentary canal, considered physiologically, may be divided into two portions; one appropriated to the conversion of the aliment into nutriment, and the other appropriated, among other functions, to the separation and discharge of the refuse matter of the aliment. The first constitutes the apparatus of digestion, and the second that of fæcation. Independently of the organs appropriated to the performance of the preparatory operations of prehension, mastication, insalivation, and deglutition, the apparatus proper to digestion consists of the stomach, the duodenum or the second stomach, the jejunum, and the ileum, the three latter portions of the alimentary canal forming the small intestines. It is in these great digestive chambers that the processes of chymification and chylification are performed; processes by which the multifarious substances taken as food are converted into an homogeneous substance analogous in its composition to the blood. The requisite changes on the food are effected partly by secretions formed by the walls of the digestive chambers themselves, and partly by secretions elaborated by distinct organs and conveyed into the digestive chambers by separate tubes. These auxiliary organs are the pancreas and the liver, the fluids secreted by which perform a most important part in the function of digestion. The chyle, the ultimate result of the action of these digestive fluids, is absorbed, as it is formed, by a set of vessels termed the lacteals, spread out upon the walls more especially of the jejunum and ileum, upon the surface of which they take their origin by open mouths.

But a considerable portion of the substances taken as food is incapable of being converted into chyle: this is separated from the chyle partly in the duodenum, and still more perfectly in the jejunum and ileum, as it flows over the walls of these extended chambers. Moreover, a considerable portion of the digestive fluids themselves does not enter into the composition of the chyle, but is separated from it and mixed with the refuse matter of the food. Again, the whole extent of the alimentary canal, from its commencement to its termination, is lined with a membrane which secretes a peculiar fluid, termed mucus. This fluid, which defends the delicate and sensitive vessels that are crowded on every point of the digestive chambers, and which maintains those chambers in a state of suppleness and moisture, is constantly formed, removed, and renewed. That portion of it which has served its office, and which has become effete, is mixed with the refuse matter of the aliment and of the digestive fluids. All these substances mixed together in a common mass are transmitted to the second portion of the alimentary canal, which consists of the large intestines; namely, the cæcum, the colon, and the rectum, by the operation of which the second part of the digestive function, that termed fæcation, is performed. This function consists of two processes; first, of that by which the common mass of excrementitious substances is brought into a state fit for its discharge from the body; and secondly, of that by which a force is generated adequate to effect its discharge. The chief agent by which these substances are brought into a state fit for their discharge is the bile. [BILE.] The agent by which their actual discharge is effected is the muscular coat of the intestines, which is excited to contraction, and thereby to the generation of the force requisite to the accomplishment of the object, by the stimulus of the bile.

It is obvious, then, that the matters to be discharged from the alimentary canal do not consist, as is vulgarly supposed, merely of the refuse portion of the food; this constitutes only a small part of those matters; an essential part of it consists of the refuse matter of secretions which have performed most important offices in the economy.

There is manifest in the performance of certain functions of the body a tendency to periodicity. The most remarkable of these are the return, at regular periods, of the necessity for sleep, of the appetite for food, and of the command to remove from the body the excrementitious matters prepared in the alimentary canal. Whatever may have first led to the formation of these habits, and however they may be varied by circumstances which operate at an early period of life, they cannot, after having been once formed, be materially and frequently interrupted, without danger to the health. The interruption of one of these habits by the retention of the fæces beyond a determinate period, namely, the period of twenty-four hours, constitutes the disease termed constipation, a disease often disregarded, generally considered of little importance, always productive of mischief, and very frequently terminating in a fatal result.

The slighter degrees of constipation, when, as is sometimes the case, they are attended with no appreciable disturbance of any function, can scarcely be considered as morbid; but, in general, a retention of the fæces beyond the period of twenty-four hours, is attended with manifest disorder. This disorder is commonly increased in proportion as the retention is protracted beyond that determinate period, and in proportion to the frequency with which such retention recurs. The amount of the disorder thus induced is however a good deal influenced by constitutional peculiarity; for there are individuals whose fæcal evacuations are not more frequent than once a week, or once a fortnight, or even once in three weeks. Such an habitual retention of the fæces, in the few cases in which it occurs, generally happens in females who lead a sedentary life, and who take little food and less exercise.

It may be sometimes difficult to connect any distinct disorder with this torpid action of the apparatus of fæcation; yet the health of the persons in whom it occurs is seldom sound, and never robust. Even in the still more extraordinary cases of constipation (and the details of many such cases are recorded in the annals of medicine), in which persons have gone five, six, seven weeks, and even, as is stated, as many months without a single fæcal evacuation, no manifest, at least no decided, injury to the health appeared to result for some time; but sooner or later, in almost every case, the enormously distended intestines became suddenly inflamed, and death followed with great rapidity. Two remarkable instances of this are on record, which it may be instructive to relate. A young female who never had more than one evacuation every two months during a period of five years, and who enjoyed good health during all that time, at length went on for the space of seven months without passing a single fæcal evacuation. Notwithstanding this extraordinary retention of the fæces, her health did not appear materially to suffer, until at last inflammation suddenly came on, which rapidly terminated life. Mr. G——, a medical officer in the French service, had always been costive from birth. He ate largely, but seldom passed a stool oftener than once in one or two months, and his abdomen assumed a large size. At the age of 42 his constipation was unusually prolonged to three or four months. In 1806, after medicines had been taken to procure a stool, which had not been passed for upwards of four months, abundant evacuations continued for nine days, and contained the stones of raisins taken a twelvemonth before; but the constipation returned. In 1809 the enlarged abdomen became painful, vomiting supervened, and he died at the age of 54, having seldom through life passed more than four, five, or six stools in the year.

These are the extreme cases of constipation; and they show the ordinary result that takes place when the unnatural distension of the intestine is brought on in the most gradual manner, and when the organ seems to be habitually accustomed to it; that is, when its extreme torpor seems to be, in the strictest sense in which such a term can be employed, constitutional. Of course when such a state of torpor comes on, in a system not habituated to it from an early period of life, the danger is increased a hundred-fold.

The immediate effects of constipation, when this disease occurs in its usual degree, in ordinary habits, is the production of some one or more of those painful states, the signs of which are generally grouped together under the common

name of dyspepsia. There is disordered appetite, which is either deficient, capricious, or voracious; a dry, coated, or clammy tongue; thirst, or some disagreeable taste in the mouth; dulness, heaviness, confusion, giddiness, or pain in the head; physical and mental torpor; dry and hot skin; and last, though not least, an irritable temper, and a capricious or a desponding mind.

The remote effects of constipation are far more numerous and serious than is commonly understood. It is impossible to enter into a full detail of them in this place. But among the most obvious may be mentioned, the origin of various diseases of the skin. Between the internal covering of the body, a principal part of which consists of the membrane which lines the inner surface of the alimentary canal, and the external covering of the body, or the skin, as there is a close relation in structure, so there is a most intimate sympathy. Pimples, blotches, eruptions, unsightly and painful, of various forms and names, have their origin in an irritation excited and maintained in the alimentary canal by fæcal retention. When the fæcal matters are retained beyond a certain period they undergo chemical changes, by which their nature, originally irritating and noxious, becomes far more acrid than in a healthy state, and in extreme cases almost poisonous to the system. There is abundant evidence that these acrid and poisonous matters are absorbed from the surface of the intestines, and carried into the blood, which they corrupt, and to which they give irritating properties. The taint thus communicated to the blood is manifest in the vitiated nature of all the excretions eliminated from it and expelled from the body, and in the corrupted condition of many of the secretions formed from it, and retained in the system; but more especially in the exhalation from the lungs and bronchi, constituting a fetid breath, and in the perspiration from the skin, forming a fetid atmosphere around the body. It is observed by Dr. Copland, that in almost every instance in which the fæces are retained four, six, eight, or ten days, the breath is loaded with an offensive vapour, or the perspiration is abundant and disagreeable, or the urine is copious and unusually loaded; and that it is thus manifest that the disorder is connected with a rapid absorption from the alimentary canal, and with an augmented evacuation by the other excretory surfaces and organs. Now, as one of the principal emunctories by which the blood endeavours to get rid of the acrid matter with which it is loaded is the skin, so the skin is one of the first organs to suffer from the irritating matter brought to it to be discharged. Hence the dirty, dull, doughy, dusky, sallow colour of the skin, giving rise to a more than sufficient variety of bad complexions, so strikingly in contrast with the fresh and bright and glowing colour of the skin where pure blood, in natural quantity and with natural velocity, circulates through it. Hence the irritating and painful eruptions which constitute a large portion of the long catalogue of cutaneous diseases that disfigure the body; and hence the numerous, and even dangerous, cutaneous diseases to which children especially are subject, in consequence of the irritation excited in their acutely sensible alimentary canal, by improper articles of diet, taken in improper quantities.

Moreover, headache and giddiness existing as severe and permanent affections, and the distinct diseases called colic [COLIC], chorea [CHOREA], epilepsy, chlorosis, hysteria, hæmorrhoids, and many others, have their most frequent origin in an habitual and protracted retention of the fæces.

The usual termination of constipation when severe, frequent, and obstinate, is, as has been stated, in inflammation of the intestines, which commonly assumes the form either of ilius [ILIUS] or enteritis [ENTERITIS], and which rapidly proves fatal.

There is, without doubt, a greater tendency to constipation in some temperaments than in others; in the melancholic, for example, than in the sanguineous, and in certain individual peculiarities of constitution. But this tendency would appear to be capable of being superinduced by the habitual use of certain kinds of indigestible food; such as imperfectly fermented bread, heavy pastry, as dumplings, &c.; indigestible vegetables, as cucumbers, melons, &c. The tendency thus superinduced may be greatly increased by the use of astringent and stimulating beverages, sedentary habits, long indulgence in sleep, &c. The immediate causes of constipation are, 1. an impaired or torpid action of the liver, in consequence of which there is either a deficient or a vitiated secretion of bile. It has been stated that one portion of the bile [BILE] mixes as an essential constituent with the chyle, by which the nutritive part of the food is assimilated to the constitution of the blood; the other portion of the bile consists of excrementitious matter, principally of a resinous nature. It is this resinous portion of the bile that constitutes the proper stimulus to the colon and rectum, whose office it is, by the contraction of the fibres which form their muscular coat, to remove the fæcal matters from the body. A certain change in the quantity or quality of the bile must therefore necessarily diminish the action of these organs, by depriving them of the stimulus on which their action mainly depends. 2. Torpor of the muscular coat of the alimentary canal itself, and more especially of that portion of it which constitutes the large intestines. 3. The production and accumulation of flatus in these organs, by which their thin parieties are distended, and even a mechanical obstacle is afforded to the passage of the fæces.

The treatment of constipation should always have in view two objects:—1. the immediate removal of the impacted fæces; and 2. the change of the pathological condition of the system in general, or of the alimentary canal in particular, on which the fæcal retention depends.

The choice of the particular remedies adopted for the immediate removal of the retained fæces is often a matter of the last importance. The coats of the intestines are already in a state of preternatural distension; they have lost in a great degree their vital power; they have a peculiar tendency to lapse, from the operation of slight causes, into the state of inflammation. All purgative medicines are irritants, and the most active are powerful irritants. If the purgative employed be of a highly acrid nature, it may excite inflammation in the intestines, by the very stimulus by which it removes the retention of the fæces; but if it irritate the intestines, without overcoming the obstruction, it will be still more likely to induce ilius or enteritis. Only the milder purgatives should therefore be employed; and in general the more protracted the retention, the less irritating should be the purgative selected to remove it. The various preparations of aloes, senna, and castor oil, combined with a narcotic, as hyoscyamus, to lessen the irritation sometimes excited even by these gentle aperients, are the safest remedies: and fortunately, when judiciously combined, alternated, and repeated, they are generally effectual. In the slighter and more ordinary cases of constipation, from three to five grains of the blue pill, with from five to ten grains of the compound gamboge, or aloetic pills, taken at bed-time, followed by a draught in the morning, consisting of equal quantities (about an ounce) of the compound infusions of senna and gentian, or about the same quantity of the compound decoction of aloes, and these doses repeated about twice a week, are all the medicines required. The remedies most appropriate for the removal of habitual and protracted constipation can be discovered only by the detection of the exact pathological condition on which the retention depends. This should be investigated with the utmost care; and when ascertained, the particular medicines, and the form of exhibiting them best adapted to the case, will be sufficiently obvious. But medicines alone, though the most judiciously chosen, and producing the best effects, will accomplish but little. The general management must co-operate with the medical treatment. There must be the strictest attention to regimen, including under this term all the known means of putting and keeping the body in general, and the disordered organ in particular, in a state of the most perfect health and vigour; namely, diet, exercise physical and mental, pure air, retirement to rest at regular and early hours, with a moderate, and only a moderate, quantity of sleep, &c. (Copland's *Dictionary of Practical Medicine*, and Southwood Smith's *Philosophy of Health*.)

CONSTITUTION, a term often used by persons at the present day without any precise notion of what it means. Such a definition of a constitution, if it were offered as one, might be defended as equally good with many other definitions or descriptions which are involved in the terms used whenever a constitution is spoken of.

The constitutions which are most frequently mentioned are the English constitution, the constitutions of the several states composing the North American union, the federal constitution, by which these same states are bound together, and various constitutions of the European continent, which

have hardly been permanent enough to be submitted to an accurate investigation.

The *vague* notion of a constitution is that of certain fundamental rules or laws by which the general form of administration in a given country is regulated, and in opposition to which no other fundamental rules or laws, or any rules or laws, can or ought to be made.

The *exact* notion of a constitution cannot be obtained without first obtaining a notion of sovereign power. The sovereign power in any state is that power from which all laws properly so called proceed; it is that power which commands and can enforce obedience. Such a power, being sovereign or supreme, is subject to no other power, and cannot therefore be bound by any rules laid down, either by those who have at any previous time enjoyed the sovereign power in the same community, or by any maxims or rules of conduct practised or recommended by its predecessors in power, whether those rules or maxims be merely a matter of long usage or solemnly recorded in any written instrument. The sovereign power for the time is supreme, and can make what laws it pleases without doing any illegal act, and, strictly speaking, also, without doing any unconstitutional act. For this word constitution, taken in its strongest sense, can never mean more than a law made or a usage sanctioned by some one or more possessed of sovereign power, which law or usage has for many generations been observed by all those who have successively held the sovereign power in the same country. To modify or destroy such a rule or law might be unwise, as being an act in opposition to that which many successive generations had found to be a wise and useful law; it might be dangerous as being opposed to that to which the prejudices of many generations had given their sanction; and it might lead to resistance on the part of the governed, if either their own interest or their passions were strong enough to lead them to risk a contest with the sovereign power. If (as would generally be admitted) the assembled parliament of Great Britain and Ireland possess the sovereign power, there is no act which they could do which would be illegal, as every body must admit: and further, there is no possible act which they could do which would be unconstitutional, for such act would be no more than repealing some law or usage having the force of law which the mass of the nation regarded with more than usual veneration, or enacting something at variance with such law or usage. For example, if the next assembled parliament should abolish the trial by jury in all cases, except criminal matters, or where the crown is the prosecutor, such an act might be called by some illegal, unconstitutional, and unwise. But it would not be called illegal by any person who had fully examined into the meaning of the word law; it would not be called unconstitutional by any man who, having called it illegal, wished to be consistent with himself: it could only properly be called wise or unwise by those who had reflected sufficiently on the nature of the institution and its operations to know whether such a modification would do more good or harm.

The words constitution and unconstitutional appear to be only strictly applicable to such a case as the following; where the sovereign power being invested in one, or two, or five hundred, or all the males of an independent political community who are above a certain age, or in any other number in such a community, lays down certain rules to regulate the conduct of those to whom the sovereign power intrusts the legislative functions. Such are the Constitutions of the several states composing the North American Union, and such is the Constitution of the Federation of these several states. In these several states the people, in the mass, and as a general rule, are the sovereign. The people assembled by their delegates, named for that especial purpose, have framed the existing Constitutions; and they change the same Constitutions in the same way whenever the majority of the people, that is, when the sovereign, chooses to make such change.

These Constitutions lay down certain rules, according to which the legislative, executive, and judicial functionaries must be chosen; they fix limits to their several powers, both with respect to one another, and with respect to the individuals who compose the sovereign. 'They do ordain and declare the future form of government.' For example, the Constitution of Virginia of 1776, declares 'that all ministers of the Gospel of every denomination shall be incapable of being elected members of either House of Assembly, or of the Privy Council.' The same rule, we believe, forms a part of the recently amended Constitution of the same state. If the Virginia legislature were to pass an act to enable clergymen to become members of the House of Assembly or of the Privy Council, such an act would be unconstitutional, and no one would be bound to obey it. The judiciary, if such a matter came before it, would, in the discharge of its duty, declare it unconstitutional, and such so-called law could have no further effect than if any unauthorized body of men had made the rule.

A constitution then is nothing more than an act of the sovereign power, by which it delegates a part of its authority to certain persons, or to a body, to be chosen in a way prescribed by Act of Constitution, which at the same time, fixes in a general way the powers of the body to which a part of the sovereign power is thus delegated. And the sovereign power changes this Constitution whenever it pleases, and in doing so acts neither constitutionally nor unconstitutionally, but simply exercises its sovereign power. No body can act unconstitutionally but a body which has received authority from a higher power, and acts contrary to the terms which fix that authority. Wherever then there is a sovereign power, consisting either of one, as the Autocrat of Russia, of three members, king, lords, and commons, as in England (provided these three members do possess the complete sovereign power), or of all the males born of American citizens and of a given age, as in most of the United States of North America—such sovereign power cannot act unconstitutionally. For to act unconstitutionally would be to act against a rule imposed by some superior authority, which would be a contradiction.

The policy of having a constitution in a state where the sovereign power is in the hands of the community, may be defended on general grounds of convenience. When the community have settled that certain fundamental maxims are right, it is a saving of time and trouble to exclude the discussion of all such matters from the functions of those to whom they have by the constitution intrusted legislative power. Such fundamental rules also present a barrier to any sudden and violent assumption of undue authority either by the legislative or executive, and oblige them, as we see in the actual workings of constitutions, to obtain their object by other means, which, if not less dangerous in the end, are more slow in their operation, and thus can be detected and are exposed to be defeated by similar means put in action by the opposing party. There are disadvantages also in such an arrangement. Constitutional rules when once fixed are not easily changed; and the legislative body when once established, though theoretically, and in fact too, under the sovereign controul, often finds means to elude the vigilance and defeat the wishes of the body to which it owes its existence, and from which it derives its power. One of the great means by which these ends are effected is the interpretation of the written instrument or constitution, which is the warrant for their powers. The practice of torturing the words of all written law, till in effect the law or rule is made to express the contrary of what seemed to be at first intended, appears to be deeply implanted in the English race, and in those of their descendants, who have established constitutional forms on the other side of the Atlantic. The value of all written instruments, whether called constitutions or not, seems considerably impaired by this peculiar aptitude to construe words which once seemed to have one plain meaning only, so that they shall mean any thing which the actual circumstances may require, or may seem to require.

It is beside our purpose to discuss the advantage of a Constitution in a community where the sovereign is one. Being supreme, the sovereign may change the Constitution when he pleases. It may be said that if the Constitution is good, and has been allowed to stand by several successive possessors of the sovereign power, it obtains an apparent prescriptive authority, which is the more binding on the sovereign, as the mass of the nation habitually regard the same Constitution as something which even the sovereign cannot touch with impunity. It would shock common prejudice if the actual sovereign were to violate that which has been sanctioned by his predecessors, and is recommended by an apparently higher antiquity than the power which, in the actual sovereign's hands, appears to be of more recent birth. The precise meaning of what is called the English Constitution must be got from the various writers who have made its origin and progress their study. In

reading them it may not be amiss to bear in mind that the word Constitution, as used by them, has not the exact, but the vague meaning as explained above.

For the nature of a Federal Government, which necessarily implies the notion of a Constitution, see FEDERATION.

CONSTITUTIONS, APOSTOLICAL or CLEMENTINE, are a code of regulations, attributed by some ecclesiastical writers to the Apostles, and said to have been collected by Clemens Romanus. The collection consists of eight books, containing a great many precepts and rules concerning the discipline, doctrine, and ceremonies of the church.

Besides the gospels, epistles, and apocalypse, which now compose the volume of the 'New Testament,' there were, in the earliest ages of Christianity, numerous writings bearing the name of the Apostles and apostolical men, of which some are extant at the present time; and it is generally considered that two among the first in order of time are the eight books of Apostolical or Clementine canons, and the Constitutions which are the subject of the present article. That the latter once constituted a part of the New Testament is evident from the last of the apostolical canons, which states that 'The holy and venerable Bible consists of the Old Testament (of which the several constituent books are enumerated) and the New Testament, which consists of the gospels of Matthew, Mark, Luke, and John; 14 epistles of Paul; 2 of Peter; 3 of John; 1 of James; 1 of Jude; 2 of Clement, and the *Constitutions* for you that are bishops, published by me Clement in 8 books, which are not to be divulged to all, because of the mystical things contained in them; and the Acts of the Apostles.' (Labbei, *Collect. Concil.*, tom i.) One of the epistles of Clement and part of the other which is attributed to him, are included in the ALEXANDRINE MS. Epiphanius (A.D. 400) cites the Constitutions not only as the work of an honest Catholic Christian, but as the divine word and doctrine; yet in his catalogue of canonical books they are not included, and it is contended that the Constitutions now extant are not identical with those from which Epiphanius cited.

The authenticity and date of this work have been a subject of much learned contention; and though by far the greater number of critics have pronounced it to be a pseudonymous compilation, made in the third or fourth century, there have been some who support the opinion of its apostolical origin.

Those who wish to examine the state of the evidence will find in the following works, and in various others to which they refer, some useful assistance. Turrianus, who argues for the authenticity of the Constitutions, in his five books Adversus Magdeburgenses, adduces many passages from Tertullian, Ignatius, Justinus, and others, as instances of quotation from them. To this Revetus replies (Criticus Sacer, p. 115, et seq.), that since these fathers say nothing of the Constitutions by name, it is just as likely that the Constitutions are compiled from the fathers as that the fathers quoted from the Constitutions. Scultetus, another opponent of Turrian, gives, in replying to him, a full analysis of all the books of the Constitutions in his Medulla Patrum, l. ii., c. 5. Cottelerius (Apparatus Patrum Apostolicorum, tom i.) declares them to be apocryphal and pseudepigraphical, and the production neither of the Apostles nor of Clement. Tillemont expresses a similar opinion. Dallæus (in Pseudipigraphis Apostolicis, lib. iii.) dates them subsequent to the council of Nice, in A.D. 325. Le Clerc (Bibliotheca) assigns their origin to some Arian in the 4th century, in which he is followed by Robert Turner in 'A Discourse on the Pretended Constitutions,' which regards them as a compilation from numerous Constitutions, canons, travels, traditions, and liturgies, ascribed to the apostles. Bishop Pearson (On the Creed,) supposes them to have been compiled from others which were attributed to Clement, Ignatius, Hippolytus, and others; but altered and interpolated since the time of Epiphanius. Archbishops Wake and Usher, the former in 'Genuine Epistles of the Fathers,' p. 105; the latter in 'Dissert. ad Ignatium,' p. 2, consider them as apocryphal and pseudonymous; but Whiston, regardless of all such opinions, contends with great learning and warmth, in his 'Vindication of the Constitutions,' 8vo., 1715, that they are quite as authentic as the writings of the New Testament, were dictated by the Apostles and written from their mouths by Clement, and that they contain a good scheme of (Arian) faith, and form a valuable supplement to the New Testament. The Constitutions are given in the great collection of Councils by Labbe, tom. i.; in the several Bibliothecæ Patrum; in Cottolerii S.S. Patrum Opera Vera et Suppositicia. (See also Bishop Beveridge, *Codex Canonum Eccles. Primitivæ vindicatus et illustratus*; Gerhard, *Hist. Juris Eccles.*, num. 122; Hoffmanni, *Lexicon*; Lardner's *Credibility*, vol. iv., p. 320-354; Lenglet, *Tab. Chronol.*, tom. ii., p. 212; Jortin's *Remarks on Eccles. Hist.*, vol. i., p. 228.)

CONSTITUTIONS, ROMAN. The word constitutio (from constituere, *i.e.*, to set up, to establish), signifies any disposition or appointment; for example, in D. iv. 2, l. 9, § 3, a decree of the prætor is called constitutio. The decrees and decisions of Roman emperors are also called constitutiones; and, according to Gaius (i. 5), an imperial constitution is what the emperor declares by a decree, or an edict, or a letter. That modern signification of the term, which denotes the fundamental law of a state, was not in use among the Romans; yet Cicero (*de Republica*, i. 45) employs the word to express a similar notion.

During the republic the Roman law was made or developed by decrees of the people in the comitia (leges and plebiscita), by decrees of the senate, and by the edicts of various magistrates, as the prætors and ædiles. [ROMAN LAW.] After the great internal change and revolutions had taken place in the Roman state, and Augustus had united in himself the powers of all the branches of government, with the direction of the senate, and of the assemblies of the people, the imperial power was firmly established. The emperor not only had the right of issuing edicts, as the magistrates of the republic had done, but he could propose and make entirely new laws. Propositions of laws from the emperor to the senate were called orationes principum. Thus arose the imperial constitutions, with the supremacy of Augustus. But as the arbitrary acts of Sulla, Pompeius, and Julius Cæsar, were ratified and confirmed by the people, both in their lifetime and after their death, this may be considered as the beginning of the system of constitutions. As the institutions of the republic only gradually merged into the imperial autocracy, the voice of the people in the comitia and the decrees of the senate were still respected in form, though not in substance. But after A.D. 24, during the reign of Tiberius, the legislation of the people, and 200 years later, the decrees of the senate also, totally ceased. From that æra laws were made only by the emperors; and from the time of Constantine the Great, the constitutions were properly called leges novæ, or new laws.

The imperial constitutions occur under different denominations; as edicta (leges edictales), or decrees addressed to and binding on all Roman subjects; decreta or rescripta, which are decisions in particular cases, upon questions proposed to the emperor by public functionaries or private persons; these decisions also were universally binding. We find the terms epistolæ also used, when the decisions were answers to magistrates, and litteræ when given in reply to private persons. Important single constitutions were often called, from the emperor who made them, 'lex Anastasiana.'

In course of time the number of these constitutions became so great, that to prevent confusion collections were made, and called codes. The first collections made by private persons were the codices Gregoriani and Hermogeniani, of which we know very little; it being even uncertain if they were two separate codes or only one. Yet it seems that the first collector was Gregorius, and that Hermogenes continued the work. Opinions vary also as to the time when these compilers lived. Their collections, which contained the constitutions from the time of Hadrian to Diocletian, are lost, and we have only some fragments, which were first edited by Jac. Sichardus (Basil, 1528, fol.), together with the Codex Theodosianus. The fragments are in Schulting's 'Jurisprud. Vet. Antejust.,' Lugd. Bat. 1712, and in the 'Jus Civile Antejust.,' Berol. 1815.

Another and more important collection was made under the reign of Theodosius II., by public authority. The emperor having nominated, in the year 435, a commission of sixteen persons, under the direction of Antiochus, for the purpose of collecting the constitutions from the time of Constantine the Great, three years afterwards (A.D. 438), the new code, called Codex Theodosianus, was confirmed by the emperor, and published in the eastern empire. It contains sixteen books, divided into titles, in which the separate constitutions are arranged, according to their subject-matter, in such a way that many of them are subdivided. Some additions, called novellæ, were afterwards made to the collection of Theodosius. The first five books

were lost, but some parts of them have been recently discovered at Milan, by Clossius (Clossii 'Theodos. Codic. Genuin. Fragmenta,' Tüb. 1824); and at Turin, by Peyron, ('Codic. Theodos. Fragm. Ined.,' Tur., 1823-4.) The best edition of the Theodosian Code is that by Jac. Gothofredus, tom. vi., Lugd., 1665, who also wrote an excellent commentary on it, which was published, together with the text, by Ritter, Leipzig, 1736-54.

In the year 506, Alaric II. made an abridgement of the Theodosian Code, adding to it the excerpts from the codices Gregoriani and Hermogeniani, and of the works of the Roman lawyers Gaius and Paulus, for the use of the Romans then living in the empire of the Visigoths: the collection is called 'Breviarium Alaricianum.'

The last and most important collection of Roman constitutions was made by the order of Justinian. [JUSTINIAN'S LEGISLATION.]

CONSTRUCTION (geometry), all formation of lines, figures, &c., which is not absolutely implied in the hypothesis of the problem or theorem in question. Thus, in the proof of the theorem, 'the square on the hypothenuse of a right angled triangle is equal to the sum of the squares on the sides,' the formation of the right-angled triangle and of the squares is not technically considered as part of the construction, the latter term being only used to imply all the additional formation of figure necessary to the proof.

A question is frequently said to be solved by construction, when it is only meant that a geometrical method of solving it is adopted [SOLUTION, GEOMETRICAL], as distinguished from an algebraical solution. An equation is also sometimes said to be constructed, in the sense inverse to that in which it is said to be solved; that is, when the roots are given, and the equation is required to be found. [EQUATIONS, THEORY OF.]

CONSUBSTANTIAL (Consubstantialis) is equivalent in expression to co-essential, and is the translation of the term ὁμοούσιος, homoousios, which, in the commencement of the fourth century, was the subject of so much zealous contention among the Trinitarian and Unitarian sects of Christians. The Arians and Eusebians, who asserted the second person of the Trinity, and the adherents of Macedonius, who asserted the third person, to be different and distinct in nature from the first, were strenuously opposed by the Athanasians, who, at the council of Nice (A. D. 325), adopted as the pass-word of their party the term ὁμοούσιος, consubstantial, or, as it is Englished in the Nicene creed, '*Of one substance* with the Father.' There were three conflicting denominations: those who held the three persons to be of the *same* substance, ὁμοούσιος; those who asserted them to be of a *similar* substance, ὁμοιούσιος; and those who contended that they were of a *different* substance, ἀνόμοιος. Between these parties the dispute was carried on during several years with great violence; and successive councils, composed of hundreds of bishops, continued to meet for the purpose of altering creeds and reciprocating anathemas. In modern times the ἀνόμοιος doctrine has been advocated by Dr. Bury in his 'Naked Gospel,' a work which, though condemned and burnt by the University of Oxford, was approved and adopted by Locke, Clarke, and Whiston. The circumstantial particulars of the antient controversy may be found in the various histories of the councils of that period, and its modern revival in the numerous works on the Unitarian doctrines. See especially the article 'Arianisme,' in Plugnet's *Dict. des Hérésies.*

CONSUBSTANTIATION, or IMPANATION, is a term adopted by the Lutheran Church to designate its doctrine of the Eucharist, in contradistinction to the transubstantiation of the Church of Rome. Luther, after separating from the Catholic communion, still retained the doctrine of the real presence; but instead of teaching, as the Romanists do, that the priest's pronunciation of the words of consecration at once deprive the bread and wine on the altar of their natural qualities, and transform them into the real body and blood of Christ, he taught, that after the consecration of the bread and wine, they are mysteriously *accompanied* with the real body and blood. In short, in *transubstantiation*, the divine body and blood is present *without* the bread and wine; and in *consubstantiation* it is present *with* the bread and wine: the former effects a change of nature, the latter a change of circumstance.

The Lutheran doctrine of consubstantiation was first introduced into the church by John, surnamed Pungens Asinus, a doctor of Paris, at the end of the thirteenth century. His work on this subject, entitled 'Determinatio F. Joannis Parisiensis de modo existendi Corpus Christi in Sacramento Altaris,' was republished by Allix in 1686.

CONSUL (a word of the same family as *consulere*, to consult), was the title of the highest ordinary magistrate in the Roman republic. King Tarquinius Superbus having been expelled from Rome for his tyrannical conduct, by the joint efforts of the patricians and plebeians, B.C. 409, a republic was established. Instead of kings, two functionaries called consuls (consules, in Greek ὕπατοι) were appointed to administer the republic. The first consuls were Lucius Junius Brutus and Lucius Tarquinius Collatinus (or M. Horatius, according to Polybius, iii. 22). The consuls were annually elected in the Comitia Centuriata, and at first only chosen from the patricians.

As the consulship was established in the place of the kingly office, the consuls also were invested with the same power that the kings had. (Niebuhr's *History* and Gibbon's *History*, i. 3; Cicero, *De Leg.* iii. 3, who ascribes to them 'regiam potestatem.') The consulate was, with the exception of the dictatorship, the highest, and, before prætor, ædiles, and censors existed, the only superior administrative office in Rome. The consuls were at the head of the whole republic: the judiciary (jurisdictio), the military (imperium), and the executive powers were all united in them. Accordingly, we find them also called prætores, and judices, and imperatores. They presided in the senate, where they had an elevated seat, and the business in the comitia curiata and centuriata was conducted by them. The consuls created the quæstors of the public treasury, and thus had great influence in the administration of the treasury, the quæstors being dependent on them. They could also conclude peace and make alliances. They were the supreme judges in all suits and criminal trials.

The consuls possessed the same external insignia of honour as the kings, except the golden crown and the trabea (purple cloak), which latter they were only allowed to wear in a triumph. They had a sceptre of ivory, with an eagle at the end. In the assemblies of the people they sat on the sella curulis (an ornamented chair); and like the other senators they wore the toga prætexta. Twelve lictors, with the fasces and axes, as the symbol of the consuls' power over the lives of the citizens, preceded each of them at first; but P. Valerius, called Poplicola, a name which implies his respect, or affected respect, for popular rights, limited the power of the consuls, and curtailed the external symbols of their authority. In the city, the axes were taken from the fasces, and only one of the consuls was preceded by the twelve lictors. From their sentence appeals to the people were allowed. From this time they were deprived of their former power of condemning citizens to death in Rome, and the power of scourging them only remained. But while they were at the head of the army out of Rome, they retained the axes in the fasces and all their former rights. The consul who, according to the settlement of Valerius, was not preceded by the twelve lictors, had a public slave, called accensus, to precede him. The right to the twelve lictors and the supreme authority in matters of administration were enjoyed by the consuls alternately from month to month.

The patricians, after expelling the kings with the help of the plebeians, designed to transfer the royal power to themselves, which they accomplished by securing the election of both consuls out of their own body. The consuls therefore being invested with the supreme power, the struggle of the people with the patricians was at the same time a struggle against the consuls. Their power sustained a great shock by the institution of the tribunes of the plebs. Each of the tribunes, whose number at last amounted to ten, had the right of putting his veto on the measures of the consuls. In order to prevent arbitrary acts of the consuls, the tribune Terentius, B.C. 461, made a proposition for a code or collection of laws, and in the year B.C. 452 ten men (decemviri) were named for this purpose, who were invested with full powers, and all other functionaries for the time were suspended. The consulate being re-established, the tribunes, B.C. 444, proposed that the people should choose consuls from the plebeians also, a proposal which gave rise to a long and violent contest. The consulship was again suspended, and tribunes of war (tribuni militares) with consular power were appointed, to which office plebeians also were made eligible. At last, B.C. 366, the first plebeian was elected consul. (Liv. vi. 42; vii. 1. 2. 21.)

Afterwards both consuls were on several occasions plebeians.

In the mean time the extension of the state made it impossible for the consuls to perform the increased duties of their office, and new functionaries were created. In B.C. 442, the censors, and B.C. 365, the prætors, were created, which latter had the judicial functions previously attached to the consulate. In relation to these new magistrates, the consul was called magistratus major, or superior magistrate.

Though the consular power was thus much diminished, it was still very great. All the officers of the state, except the tribunes, were under the consuls; they summoned the meetings of the senate, received all dispatches, and gave audiences to foreign ambassadors. In time of war they were commanders-in-chief, and the election of the military officers partly depended on them. In critical times the consular power was made unlimited by the decree of the senate, 'videant consules ne quid respublica detrimenti capiat' (they should take care that the republic sustained no harm). Under such circumstances they could require the strictest obedience from all the citizens; and they resumed their right to condemn to death without appeal.

The imperium or military command was granted to the consuls by the lex curiata [COMITIA], whereby a province (*provincia*) was assigned to them. The term *provincia* originally denoted the power given to discharge some public duty out of Rome, particularly the command of the army in conquered countries; and these countries themselves were called provinciæ (provinces). When a consul, after the expiration of his term of office, was appointed to govern a province, he was called pro-consul.

At first no particular age was a necessary qualification for the consulate. But by the lex Annalis, proposed by the tribune L. Villius, in the year B.C. 181, a certain age was required for each magistrate; and the consul must be forty-three years of age. But this law was not always observed; M. Valerius Corvus was elected consul in his twenty-third, and Scipio Africanus in his twenty-eighth year. No one could legally be re-elected till after an interval of ten years; but M. Valerius Corvus was re-elected six times, and Marius seven times.

The candidate for the consulate was required to be at Rome when the election took place in the comitia centuriata, a rule which was also sometimes not regarded. The elder of the two consuls first received the fasces, until the Emperor Augustus prescribed, by the law called lex Julia and Papia Poppæa, that he should take them first who had most children. The time of election varied at different periods of the Commonwealth; but they were always chosen some time before they entered on office, and were called designati. The time of entrance on office likewise varied; but about B.C. 154 it was fixed that they should always enter on their office on the 1st of January. The years were named after the consuls, and annual registers were kept for that purpose, which were called fasti consulares. When the consuls entered on their office, they went in a solemn procession to the capitol to sacrifice to Jupiter Capitolinus; and after this ceremony the senate held a solemn session. Within the five next days they were to take the oath to administer the republic according to the laws; and at the end of their term of office they took a similar oath. Those who had discharged the office of consul were called consulares, and enjoyed a kind of preeminence in rank over the other senators.



[Consular Medal of M. Agrippa.]

British Museum. Actual size. Bronze. Weight, 158 grains

From the time of Sulla and Cæsar, who were elected perpetual dictators, the consulate gradually lost all its powers, and under the emperors it sunk to a mere shadow and a name. Yet consuls were still annually elected by the people, until the time of Tiberius, who ordered that they should be chosen by the senate. The number of the consuls was much augmented by the emperors; and several kinds of consuls were made, as consules ordinarii, after whom the years still were called; consules suffecti, elected by the emperors; and consules honorarii, who had title and rank, but no power. The last consul after whom the year was denominated, was Basilius, junior, in the year 1294 A.U.C. or 541 A.D., in the reign of the Emperor Justinianus.

CONSUL, an officer appointed by a government to reside in some foreign country, in order to give protection to such subjects of the government by whom he is appointed as may have commercial dealings in the country where the consul resides, and also to keep his employers informed concerning any matters relating to trade which may be of interest or advantage for them to know. To these duties are sometimes superadded others having objects more directly political, but into this part of a consul's duty it is not necessary to enter at present, as such functions are assigned to consuls not as such, but in the absence of an ambassador or other political agent. The duties of an English consul, as such, cannot perhaps be better described than by giving the substance of the general instructions with which he is furnished by the government on his appointment.

His first duty is to exhibit his commission, either directly, or through the English ambassador, to the authorities of the country to which he is accredited, and to obtain their sanction to his appointment: the document whereby this sanction is communicated, is called an exequatur; its issue must precede the commencement of his consular duties, and its possession secures to the consul 'the enjoyment of such privileges, immunities, and exemptions, as have been enjoyed by his predecessors, and as are usually granted to consuls in the country in which he is to reside.' It must be the particular study of the consul 'to become conversant with the laws and general principles which relate to the trade of Great Britain with foreign parts; to make himself acquainted with the language and with the municipal laws of the country wherein he resides, and especially with such laws as have any connexion with the trade between the two countries.' It is the consul's principal duty 'to protect and promote the lawful trade and trading interests of Great Britain by every fair and proper means;' but he is at the same time 'to caution all British subjects against carrying on an illicit commerce to the detriment of the revenue and in violation of the laws and regulations of England, or of the country in which he resides;' and he is to give to his own government notice of any attempt at such illicit trading. The consul is 'to give his best advice and assistance, whenever called upon, to his Majesty's trading subjects, quieting their differences, promoting peace, harmony, and good-will amongst them, and conciliating as much as possible the subjects of the two countries upon all points of difference which may fall under his cognizance.' Should any attempts be made to injure British subjects in person or in property, he is to uphold their rightful interests and the privileges secured to them by treaty. If, in such cases, redress cannot be obtained from the local administration, he must apply to the British minister at the court of the country in which he resides, and place the matter in his hands. The consul must transmit to the Secretary of State for Foreign Affairs, at the end of every year a return of the trade carried on at the different ports within his consulate, according to a form prescribed. He is also required to send quarterly an account of the market prices of agricultural produce in each week of the preceding three months, with the course of exchange, and any other remarks which he may consider necessary for properly explaining the state of the market for corn and grain. It is further his duty to keep his own government informed as to the appearance of any infectious disease at the place of his residence. The consul is required to afford relief to any distressed British seamen, or other British subjects thrown upon the coast, or reaching by chance any place within his district, and he is to endeavour to procure for such persons the means of returning to England. He is to furnish intelligence to the commanders of king's ships touching upon the coast where he is, and to obtain for them, when required, supplies of water and provisions, and he is to exert himself to recover all wrecks and stores belonging to king's ships when found at sea, and brought into the port where he resides.

In most cases consuls are subjects of the state by whom they are appointed, but this is by no means an invariable rule, and they are sometimes the subjects of the country in which they reside, or of some other country foreign to both. Persons are usually selected for filling the office from among the mercantile class, and it very commonly happens that they are engaged in commercial pursuits at the port where their official residence is fixed. In this respect the English government is chargeable with some inconsistency, for while, in many instances, British consuls are permitted to trade, in others they are expressly interdicted from so doing. It would be difficult to discover the application of any fixed principle in determining the places where either of these opposite rules has been adopted. We believe the interdiction to be of modern application, and that the desire of diminishing the public expense has since led, in many cases, to the relaxation of what was once intended to be made a general rule, it being necessary to give a higher salary whenever trading is not allowed. Many traders are willing to undertake the office at a low rate of direct remuneration for the sake of the commercial influence which it brings, and which is frequently of far greater value to them than any salary which the government would give. The policy of this kind of economy has been much questioned.

The number of consuls and vice-consuls appointed by the English government, and their distribution in the year 1835, were as under:—

	Consuls-General.	Consuls.	Vice-Consuls.	Unpaid Vice-Consuls.
Russia	1	5	1	5
Sweden	0	2	0	14
Norway	0	2	0	16
Denmark	0	1	1	6
Prussia	0	1	4	2
Hamburg	1	0	1 } Germany.	7
Bremen	0	0	1	
Lubeck	0	0	1	
Cuxhaven	0	0	1	0
Holland	0	2	0	7
Belgium	0	2	0	3
France	0	11	1	29
Spain and Spanish Colonies	0	12	1	58
Portugal	1	3	5	19
Italy	0	8	3	34
Austria	1	1	3	2
Sicily	0	0	0	10
Greece	0	2	2	14
Turkey	1	2	8	6
Syria	1	2	2	1
Egypt	1	1	2	3
United States of America	0	9	1	16
Mexico	1	0	3	1
Guatemala	0	1	0	0
Columbia	0	5	1	2
Brazil	0	4	2	3
Monte Video	1	0	0	0
Buenos Ayres	0	1	0	0
Chili	1	2	1	0
Peru	1	1	1	1
Hayti	0	1	2	2
Sandwich Islands	0	1	0	0
	11	82	48	261

The salaries paid vary not only in the manner above stated, but likewise according to the particular circumstances attending the appointment, a residence in some countries being necessarily more expensive than in others.

The total amount paid in salaries to English consuls and vice-consuls in 1835 was 61,950*l.*; in 1825 the amount was 71,716*l.* In addition to their salaries, consuls are in the receipt of fees on signing various documents, but these fees are of small amount. In 1834 only 12,143*l.* was divided among the whole number in unequal proportions: the largest, at Rio de Janeiro, in that year was 980*l.*; while, in some cases, the sum did not exceed one or two pounds.

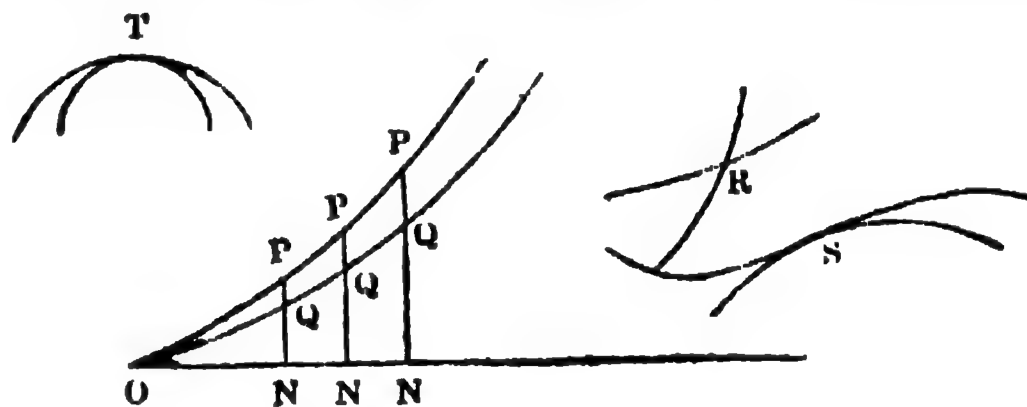
CONSUMPTION, PULMONARY. [Phthisis Pulmonalis.]

CONSUMPTION, MESENTERIC. [Marasmus.]

CONSUMPTION, in political economy, is the end of production; the use, the expenditure, of articles produced. It is unnecessary here to enter upon any examination of the theories of *productive* and *unproductive* consumption, which have so largely occupied the attention of writers upon political economy. We have stated the general principle under the head Accumulation. The natural relations between production and consumption appear very unlikely to be greatly disturbed in any condition of society in which there is freedom of labour and security of property. The most injudicious and extravagant consumption on the part of the few is, in its degree, a stimulus to a more strenuous production on the part of the many; and under these circumstances there is sure to be that excess of production over consumption which constitutes capital. The creation of capital shows that the production has been greater than the unproductive consumption. A judicious and well-regulated expenditure on the part of the few would doubtless afford a more certain encouragement to the industry of the producers, and the excess of production over consumption would, in the long run, be greater. Whatever injury the improvident consumption of individuals may cause to themselves, it is quite clear that the producing class of society will always repair the waste of the spending class; that in point of fact there will be an excess of production over consumption, wherever the course of industry is not impeded by bad laws, or by a wasteful consumption on the part of a government. Whenever a government engages in the ruinous consumption incidental to war, for example, a very powerful stimulus may indeed be given to particular branches of industry; but other branches of industry that would have been encouraged had their money remained in the pockets of the tax-payers, will proportionately be depressed. The compensating power of production that is called forth in all cases of private consumption must be deranged, or unequally and therefore imperfectly excited, by the consumption of the state.

CONTACT. (Geometry.) Two lines, one of which at least is curved, are said to be in contact when they have a common point, and recede from that point in such a way that the deflection of the one from the other will, if a sufficiently small departure be taken, become as small a fraction as we please of that departure; that is, if there be no limit to the smallness of the ratio which P Q may be made to bear to O N, as we approach the point O. The subject will be further discussed mathematically in Tangent, Curvature, Curves (Theory of),—Surfaces (Theory of); and we shall at present confine ourselves to pointing out the connexion between the preceding definition, which is refined and mathematical, and the obvious ocular phenomenon, by perception of which we immediately admit a marked difference of character between *contact*, as shown at S, and simple *intersection*, as shown at R.

All our perceptions of lines being ocular and physical in the first instance, there is a *minimum visibile*, or least visible distance, at which lines will run into each other. Now if P Q and O N always preserve such a ratio to each other



that the *minima visibilia* of these lines arrive nearly together, P Q will not be lost to sight before O N, and the curves will continue distinct up to the very point of meeting. But if P Q diminish so rapidly as compared with O N, as to be lost to sight while O N is still visible as a length, the two curves will appear to coincide for a visible length, which forms the principal ocular feature of contact. But this *practical* contact is not admitted in geometry, a science of reason, in which no length is considered as invisible; so that contact is only said to exist where the ratio of P Q to O N diminishes—not merely very much—but without limit. Let O N and P Q be the fractions x and v of a linear unit. If then v diminish without limit when compared with x, but always retain a finite ratio to x^2, the contact is said to be *of the first order*; if v also diminish without limit when compared with x^2, but always retain a finite ratio to x^3, the contact is said to be of the second order, and so on. These different orders of contact exhibit nothing to the eye but a closer approach, the higher the order of contact; except in this, that contacts of an even order are always accompanied by the *intersecting* coincidence shown at S, while contacts of an odd order make the curves tangent to each other in the sense in which the word is used by Euclid.

CONTAGION, THE MATTER OF, a poison which, on entering the blood, produces a definite train of morbid phenomena, and which communicates to the blood the property of generating a similar poison, capable of producing precisely similar morbid phenomena. Considered as a morbific matter *sui generis*, contagion, then, is an agent which produces a disease of a definite nature, one of

the distinctive characters of which is that in its progress a peculiar matter is secreted from the blood, which, when introduced into the blood of another individual, produces precisely the same disease. The term contagion is also in common use to denote the actual propagation of diseases of a specific nature from person to person. Such diseases, so propagated, are called contagious; and the matter by which they are propagated is called contagious matter or contagion.

The disease called small-pox exhibits a series of morbid phenomena peculiar to itself. These peculiar phenomena constitute it a distinct or generic disease. The pustules formed in its progress, the formation of which is one of the series of morbid phenomena distinctive of it, contain a peculiar secretion, a specific poison, which, on being introduced into the blood of a person previously in sound health, as by inoculation, produces in that person small-pox. This disease, then, presents all the characters of a contagious disease.

According to the etymological signification of the term, the propagation of disease from person to person by contagion depends on the actual contact of the body which receives with that which communicates the poison. But direct contact is not indispensable to the propagation of a contagious disease. There are contagious diseases which are absolutely incommunicable without direct contact; but there are others which are capable of communication both by contact and without it. A particle of the matter of small-pox, for example, placed in direct contact with the body, will produce small-pox; but the matter of small-pox is likewise capable of being dissolved or suspended in the air; and the air thus loaded with small-pox matter, on coming in contact with the body, is capable of producing small-pox. Hence contagious diseases are divided into two great classes; into those in which the contagious matter acts only by positive contact of person with person, and into those in which it acts both by positive contact and through the medium of the air. Contagion may therefore be said to be immediate or mediate, contactual or remote.

Contagion is carefully to be distinguished from infection. The distinction is clear and broad. From not regarding it, medical men have fallen into the grossest errors, both in their so-called facts and in their reasonings. It is of great importance, theoretically and practically, that this distinction should be understood; it is a subject in which, on many accounts, the public has a deep interest; and an attempt will be made to elucidate it under the article Infection. [INFECTION.]

CONTARINI, an illustrious family of Venice, which has given to the republic many senators, doges, and statesmen. The first doge of the name was Domenico Contarini, in the eleventh century; another, Andréa Contarini, was doge during the war of Chiozza. After the Genoese had taken that place, and were threatening the very existence of Venice, in 1380, Contarini, then eighty years of age, led the Venetian fleet against the enemy; and being assisted by Vettor Pisani and Carlo Zeno, he defeated the Genoese, retook Chiozza, and thus saved the republic. Ambrogio Contarini was sent, in 1473, by the republic, then at war with Mahomet II., as ambassador to Hussum Hassan Bey, sovereign or usurper of Persia, to contract an offensive alliance against the Ottomans. The coasts of Asia Minor and Syria being occupied by the Turks, Contarini was obliged to take his way through Poland and Tartary to Caffa in the Crimea, from whence he crossed the Euxine to the mouth of the Phasis, and thence proceeded through Mingrelia and Armenia to Persia. He met Hussum Hassan at Ispahan, accompanied him to Tabreez, and then returned homewards by Derbent and the Caspian Sea to Astrakhan, and thence to Moscow, where he was well received by the grand duke of Muscovy. He returned to Venice in 1477, and published the journal of his mission, which is curious, and written with much apparent regard to truth. 'Itinerario nell' Anno 1473, ad Usun Cassan Ré di Persia,' 4to., Venezia, 1524. Hussum Hassan attacked Mahomet, while the Venetian fleet was ravaging the coasts of Asia Minor; but the Persians were defeated by the Turks near Trebizond, and the alliance led to no other result than to effect a temporary diversion in favour of Venice. There have been also several men of learning of the family of Contarini, such as Cardinal Gaspare Contarini, in the sixteenth century, who was employed on several important missions, and wrote many philosophical and theological works; among others, 'De Immortalitate Animæ adversus Petrum Pomponacium,' 'De Libero Arbitrio et Prædestinatione,' and also a treatise, 'De Magistratibus et Republica Venetorum.' His works were collected and published together at Paris, folio, 1571. Vincenzo Contarini was professor at Padua at the beginning of the seventeenth century. He wrote several works on classical erudition; 'De re frumentaria,' 'De Militari Romanorum Stipendio,' and 'Variarum Lectionum Liber.'

CONTEMPT. A contempt in law is a disobedience of the rules, orders, or process of a court of justice, or a disturbance or interruption of its proceedings. Contempts by a contumacious resistance to the process of a court, such as the refusal of a sheriff to return a writ, are punishable by attachment; but contempts done in the presence of the court, which cause an obstruction to its proceedings in administering the law, may be punished or repressed in a summary manner by the commitment of the offender to prison or by fining him. The power of enforcing their process, and of vindicating their authority against open obstruction or defiance, is incident to the nature of all courts; and the means which the law intrusts to them for that purpose are attachment for contempts committed *out of* court, and commitment and fine for contempts done *in facie curiæ*. [ATTACHMENT.] (See Viner's *Abridgement*, tit. 'Contempts.')

CONTENT (contentus, contained), the quantity of space contained in any portion of space, measured by the number of times which some arbitrary unit is contained in the space. Thus, linear content is simply LENGTH; superficial content is AREA or surface; solid content (in which sense the word is principally used), also called volume, is the number of solid units contained in a space. These solid units are always cubes, described in the unit of length. Thus, when the inch or foot is employed in measuring lengths, the cubic inch or cubic foot is always employed as the measure of solid content.

The solid content of a parallelopiped (or figure like a box) is found by multiplying together the units in the lengths of its three dimensions. Thus, 3 feet of length, $2\frac{1}{2}$ feet of breadth, and 4 feet of height, give $3 \times 2\frac{1}{2} \times 4$, or 30 cubic feet.

The solid content of any cylinder or prism is found by multiplying together the number of square units in the base and the number of linear units in the altitude; and one-third of a similar product is the content of a pyramid or a cone. The content of any irregular solid bounded by planes must be found by dividing it into pyramids.

Weight is thus connected with content accurately enough for common purposes. Multiply the number of cubic *feet* by 1000 times the specific gravity; the result is the number of ounces avoirdupois. Roughly, multiply the number of cubic feet by the specific gravity, and five-ninths of the result is the number of cwts. Thus, the specific gravity of brick being 2, a cube of bricks 20 feet long every way weighs $\frac{5}{9}$ of $20 \times 20 \times 20 \times 2$, or 8889 cwt.

To find the solid content of a sphere, take $\frac{377}{90}$ths of the rad. × rad. × rad. Thus, the radius of a sphere being 4 feet, the number of cubic feet contained is $4 \times 4 \times 4 \times 377 \div 90$, or 268·1.

CONTINENTAL SYSTEM, the phrase used by Bonaparte to designate his scheme for combining the strength of the Continent against Great Britain. It was in part developed in the Berlin decree, issued 21st November, 1806, which declared that the British islands were to be considered as in a state of blockade by all the Continent; forbade under severe penalties all correspondence or trade with England; ordered all letters to and from England to be detained and opened at the post-offices; denounced as contraband all articles of English manufacture, or the produce of the British colonies; and declared property of every kind belonging to British subjects, wherever found, to be lawful prize. From this time Bonaparte adopted it as the rule of his policy to compel all the continental powers who would remain at peace with him to comply with these commercial regulations, and in addition to seize and imprison all English subjects found within their dominions.

CONTINUED BASE, in Music, is the figured base of a score used throughout, and so called to distinguish it from the vocal base, as well as from the base staves assigned

to particular instruments. The term is only to be found in very old music, and is now become obsolete.

CONTORTÆ. [APOCYNACEÆ.]

CONTRABAND, from the Italian *Contrabando*, against the proclamation, a term commonly used in commercial language to denote articles the importation or exportation of which is prohibited by law. Since the adoption of the warehousing system in this kingdom, the list of goods the importation of which is prohibited has been made exceedingly short; it comprises at this time (1836) only the following articles:—

Arms, ammunition, and utensils of war, by way of merchandize, except by license from his Majesty for the public stores only.

Books first printed in the United Kingdom, and reprinted in any other country and imported for sale.

Cattle, sheep, swine, lamb, mutton, beef or pork, fresh or corned, or slightly salted.

Clocks or watches, with any mark or stamp representing any legal British assay mark or stamp, or purporting to be of British make, or not having the name and abode of some foreign maker visible on the frame and the face, or not being complete.

Coin, counterfeit, or not of the established standard in weight and fineness.

Fish of foreign taking or curing, or in foreign vessels, except turbots, lobsters, stock-fish, live eels, anchovies, sturgeon, botargo, and caviare.

Malt.

Snuff-work, tobacco stalks, and tobacco-stalk flour.

The list of articles contraband as regards exportation from the United Kingdom is still more limited, and is in fact included under three heads: viz.

Clocks and watches: the outward or inward case or dial-plate of any clock or watch without the movement complete, and with the clock or watchmaker's name engraved thereon.

Lace made of inferior metal, in whole or in part, to imitate gold or silver lace.

Tools, utensils, and machinery.

The schedule of prohibitions to importations was formerly much more extensive. As it stands at present, if we except those articles which are introduced for the protection of agriculture, warlike stores, and fish, the insertion of which last is intended for the encouragement of a branch of native industry, the list is calculated only for the prevention of fraud. The same might be said of the second list, if it did not contain the prohibition to export tools and machinery; this restriction has of late years been very much relaxed under the power given by Act of Parliament to the Board of Trade to license upon application the exportation of such tools and machines as in the opinion of the Board may without inconvenience be allowed to go out of the country; and at present the restriction is limited almost entirely to machinery required for the prosecution of the processes of spinning various kinds of yarn.

There are some other prohibitions by which trade in certain articles is restricted; but these refer to the manner in which the trade may be conducted, as the size of the ship, or the package, or the country from or to which the trading may take place, and these being only of the nature of regulations, the articles in question cannot be considered contraband. Of this nature are the prohibitions which extend to our colonies, and which have for their object the encouragement of the trade of the mother country. The list of articles prohibited by many foreign countries is much larger than that enforced in this country; though the system in the case of some of those countries has of late been somewhat relaxed. The tariff of Russia is however still principally filled by designating articles which are contraband.

Another sense in which the term contraband is applied refers to certain branches of trade carried on by neutrals during the continuance of war between other countries. It has always been held under these circumstances, that belligerents have a right to treat as contraband, and to capture and confiscate, all goods which can be considered munitions of war, under which description are comprehended everything that can be made directly and obviously available to a hostile purpose, such as arms, ammunition, and all kinds of naval stores, and all such other articles as are capable of being used with a like purpose, such as horses, and timber for building ships. Under some circumstances, provisions which it is attempted to convey to an enemy's port are contraband, as when a hostile armament is in preparation in that port. These restrictions rest upon principles which are reasonable in themselves, and have been generally recognised by neutrals; others which have at various times been enforced or attempted to be enforced have been contested, but a description of this branch of the subject belongs rather to the matter of International Law, than to a description of contraband trading.

CONTRACT. [AGREEMENT.]

CONTR' ALTO; CONTRATENOR. [ALTO.]

CONTRARY and CONTRADICTORY. Two propositions are contrary when the one denies every possible case of the other: they are contradictory, when one being universal, the other denies some only of the things asserted in the first. Thus the contrary proposition to 'every A is B' is 'no A is B,' and its contradictory is 'some As are not Bs.

Contrary propositions may be both false, but cannot be both true; as in 'all angles are equal,' and 'no angles are equal.' But of contradictory propositions one must be true and one must be false; either 'all angles are equal,' or 'some angles are not equal.' One of the most common fallacies of conversation and debate (and occasionally of written argument) is fixing the assertion of the contrary upon one who simply contradicts. And on the other hand, nothing is more common than to assume a contrary as proved upon grounds which establish only the contradictory.

The most easy way of establishing general propositions is, in many cases, the refutation of the contradictory; and here is another source of error, since the refutation of the contrary is frequently supposed to have the same effect.

CONULA'RIA. [ORTHOCERATA.]

CONULI'NA. [POLYPIARIA MEMBRANACEA.]

CO'NULUS. [ECHINODERMATA.]

CONUS (zoology), a genus of gasteropodous mollusks, founded by Linnæus; and though multitudinous in species, left untouched by modern zoologists, with the exception of De Montfort.

Animal elongated, very much compressed and involved, with a very distinct head, terminated by a proboscis capable of much extension; *mouth* with a tongue rather short, but projecting, and armed with two rows of sharp teeth; tentacula cylindrical, carrying the eyes near the summit; foot oval, elongated, wider before than it is behind, with a transverse anterior channel; *mantle* scanty, narrow, forming an elongated siphon in front.

Shell thick, solid, rolled up, as it were, in a conical form; epidermis membranous, sometimes very thick; spire of different degrees of elevation, sometimes almost flat; aperture long and very narrow, widening a little anteriorly; lips generally straight and parallel, the outer lip simple and sharp-edged, sometimes a little curved, the inner lip without any plaits on the columella, but with a few elevated striæ on its anterior termination. *Operculum* horny, very small, subspiral, with a terminal summit, placed obliquely on the back part of the foot, and, when compared with the length of the aperture, appearing like a rudiment.

Geographical Distribution.—Southern and tropical seas. The form becomes gradually less developed as the locality approaches the north. In the Mediterranean there are a few species, but none appear to have been detected in the northern seas.

Habits.—Carnivorous. Found on sandy mud at depths varying from near the surface of the sea to seventeen fathoms.

The species are very numerous. Lamarck records 181 recent; and several of these include varieties. Deshayes in his Tables gives the same number. To these must be added one new species described by Mr. G. B. Sowerby in his 'Genera,' four new species brought to this country by Lieutenant Belcher, R.N., and by the Blossom, described by Mr. Broderip and Mr. G. B. Sowerby (*Zool. Journal*, vols. iv. and v.), together with six new species and some varieties described by Mr. G. B. Sowerby, and thirteen new species and several varieties described by Mr. Broderip from Mr. Cuming's collection (*Zool. Proceedings*). The following observations of Mr. Broderip in his introduction to the descriptions may be of use to the student. After pointing out the difficulty of the task arising from the infinite varieties presented by the genus, and the very few points of form and structure in the shell that can be relied on as

the foundation of specific character, the author thus continues: 'M. de Blainville, when noticing the numerous species already recorded, gives us a hint that many of them may be what Adanson calls "espèces de cabinet," and no one can examine an extensive collection of *cones*, particularly if it contain many individuals of each species, for the purpose of comparison, without being struck by the force of the observation. Colour, granulation, or smoothness, length or shortness of the spire, its plainness or coronation, will be found in many species the result of locality, food, or temperature.' M. Duclos, in reference to the numbers given by Lamarck, states, that he is convinced that there are many of the species which can only be regarded as varieties at most.

Many of these species and varieties are very beautiful, both in shape and colour, and the genus has always been highly valued by collectors. *Coni, gloria-maris, cedo-nulli, omaicus, aurisiacus, ammiralis,* and some others, have brought very large prices, and some of the finest specimens of these shells are now in this country.

Lamarck separates the genus into two divisions: the first comprising those species whose spire is coronated; and the second those whose spire is simple. By far the greater proportion of species belong to the latter division.

De Blainville thus divides the genus.

α.

Conical species with a projecting spire, which is not crowned with tubercles. (Example, *Conus generalis*.)

β.

(Genus Rhombus, De Montfort.)

Conical species with a coronated spire, which is either projecting or flattened. (Example, *C. imperialis*.)

γ.

(Genus Cylinder, De Montfort.)

Species a little elongated, suboval; the spire projecting and pointed, but not coronated. (Example, *C. textile*.)

δ.

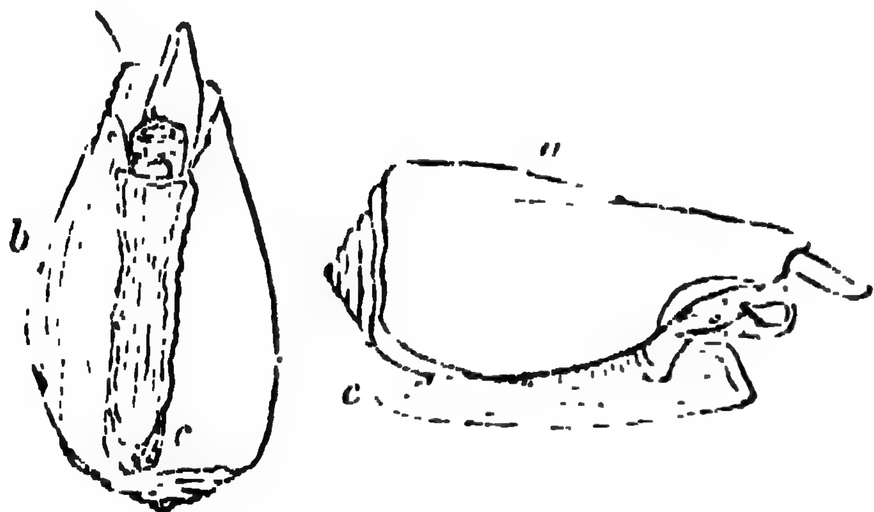
(Genus Rollus, De Montfort.)

Subcylindrical species, the spire apparent and coronated. (Example, *C. geographus*.)

ε.

(Genus Hermes, De Montfort.)

Elongated, cylindrical species with a projecting spire, and the aperture as in the genus *Terebellum*, that is, angular posteriorly. (Examples, *C. Nussatella* and *C. mitratus*.)



[Animal of Conus bandanus.]
a, seen in profile; *b*, view of under side; *c*, operculum.

Mr. G. B. Sowerby ('Genera of Recent and Fossil Shells') observes, that the *cones* are liable to be confounded with the *Pleurotomata*, and the young specimens of some *Strombi*; and those which are rather ventricose with young *Cypræœ*; but that they may be distinguished from the *Pleurotomata* by their short spire, their linear aperture, and their straight columella; from the young *Strombi*, by their being entirely destitute of varicose sutures, and by their never having any appearance of a notch near the lower extremity of the outer lip; the young *Strombi* moreover are seldom, if ever, so regularly conical; and from the young *Cypræœ* by the thickness of their shell, by the coronated or abrupt spire, and by their not being naturally polished in every part, which the *Cypræœ* always are, in consequence of the want of epidermis which covers the shell of the *cone*, while in the *Cypræœ* the large mantle comes in contact with the whole of the shell.



[Shell of Conus generalis.]

FOSSIL CONIDÆ.

Lamarck records nine fossil species. Deshayes in his Tables makes the number 49 (tertiary), one of which, *C. Mediterraneus*, he gives as both living and fossil (tertiary). Mr. G. B. Sowerby ('Genera') says, 'Fossil cones are not unfrequent; but we believe that they occur only in the newer strata, or those above the chalk, such as the London clay and crag in England, the calcaire grossier in France, and the contemporaneous beds in other countries: there are a few seen in collections, filled with a coarse, dark-green arenaceous substance; these belong to the *Terrains calcareo-trappéens* of Brongniart. Doubtful casts are met with in the inferior oolite, according to Conybeare and Phillips.' The same author gives a figure of *C. dormitor*, a fossil from Barton, approaching very near to a *Pleurotoma*. Many species are found in the blue marls of the south of France. (M. Marcel de Serres.) M. de Basterot gives many from Bordeaux and Dax, &c., one of them, *C. deperditus* of Lamarck, as analogous to the existing species at Owhyhee. Among the fossil species from the western borders of the Red Sea, collected by Mr. James Burton, named by Mr. Gray and Mr. Frembley, and communicated to Mr. Lyell by Mr. Greenough, are twelve species all living; but neither *C. Mediterraneus* nor *C. deperditus* appears in the list.

CONVENT, from the Latin *conventus*, an assembly or meeting together. This word is used in a double sense, first, for any corporation or community of religious, whether monks or nuns; and secondly, for the house, abbey, monastery, or nunnery in which such monks or nuns dwell. Shakspeare uses it in the first sense, when he says of Wolsey—

'At last, with easy roads, he came to Leicester,
Lodged in the abbey, where the reverend abbot
With all his convent honourably received him.'
Hen VIII, act iv, sc. 2.

Addison uses it for the building:—'One seldom finds in Italy a spot of ground more agreeable than ordinary that is not covered with a convent.'

Furetiere, who wrote his dictionary in the time of Louis XIV., says there were no fewer than 14,000 convents formerly in France.

Convent, as related to the foreign military orders, meant the principal seat or head of the order. Furetiere says, 'La Commanderie de Boisy, près d'Orleans, est le Convent général de l'Ordre de St. Lazare.'

The earliest inhabitants of convents were termed Cœnobites, from the Greek words κοινός and βίος, as living in community. They dwelt chiefly in Egypt. Fleury (*Hist. Eccles.*, 4to., Paris, 1720, tom. v., p. 14) dates their institution as early as the days of the Apostles; others, probably with more correctness, give them a later origin. St. Pachomius, abbot of Tabenna, on the banks of the Nile, who was born at the close of the third century, is believed to have been the first person who drew up a rule for the Cœnobites. (Moreri, *Dict. Histor.*, tom. viii.)

CONVENTION, MILITARY, a treaty made between the commanders of two opposing armies concerning the terms on which a temporary cessation of hostilities shall take place between them. It is usually solicited by that

general who has suffered a defeat, when his retreat is not secure and small chance is left of maintaining his position; and it is seldom refused by the victor, since, without incurring the unavoidable loss attending an action, his force becomes immediately disposable for other operations.

In 1757 the duke of Cumberland, when in danger of being surrounded, entered into a convention with the duke de Richelieu, through the medium of Denmark, by which, on consenting to disband all his auxiliaries, he was allowed to retire with the English troops across the Elbe. And in 1799, when the Anglo-Russian army failed in the attempt to deliver Holland from the French power, the duke of York made a treaty with General Brune by which the invading force was allowed to re-embark on condition that 8000 French and Dutch prisoners of war in England should be restored.

After the battle of Vimiero in 1808, the duke of Abrantes, having been defeated, and fearing a general rising in Lisbon against him, sent General Kellerman to the quarters of the British commander-in-chief, to request a cessation of arms, and propose a convention by which the French troops might be allowed to retire from Portugal. This being granted, it was finally arranged in the convention that they should not be considered as prisoners of war; and that, with their property, public and private, their guns, and cavalry horses, they should be transported to France: on the other hand, all the fortresses which had not capitulated were to be given up to the British, and a Russian fleet, then in the Tagus was to be detained in English ports till after the conclusion of a peace. This is the celebrated convention which was made at Lisbon, and is generally but improperly called 'of Cintra.' It excited much dissatisfaction both in Portugal and England, as the cupidity of the French induced them to appropriate to themselves property to which they had no claim. (Napier, vol. i.). By the appointment of a committee consisting of one individual of each of the three nations, all causes of complaint were, however, finally removed.

CONVERGENT, CONVERGENCY, DIVERGENT, DIVERGENCY. When a series of numbers proceeding without end, has terms which diminish in such a manner that no number whatsoever of them added together will be as great as a certain given number, the series is called convergent. But when such a number can be added together as will surpass any given number however great, the series is called divergent. Thus of the two following series—

$$1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} +, \&c., \text{ and } 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \&c.,$$

the first is convergent, for no number of its terms, however great, will amount to 2: the second is divergent, and the sum of its terms may be made to exceed any number. By going a mile, then half a mile, then a quarter of a mile, &c., two miles could never be completed: but by going a mile, then half a mile, then one third of a mile, &c., a hundred million of miles, or any greater number, could be surpassed.

The subject of the convergency of series is one of fundamental importance in the whole of the mathematics; but it is seldom treated in works on algebra in the manner which its importance requires. Algebraical writers seem to have imagined that a series, however obtained, is safe and fit for use, whether convergent or divergent. If this be true, which, in a sense understood by writers on the higher part of the subject, we do not altogether deny, it is certainly not true to the beginner, without a great deal more of demonstration than is usually given. Considering the paucity of information which exists in our works on algebra, we shall state, rather more fully than usual, the results of investigation on the subject, together with the references to sources of information.

1. Series of increasing terms are certainly divergent.

2. Series of decreasing positive terms are divergent, unless the terms diminish without limit.

3. Of series of positive terms which diminish without limit, a test of convergency or divergency may frequently be given as follows. Let $a, b, c, d, e,$ &c., be the terms of the series: form the new series

$$\frac{b}{a}, \frac{c}{b}, \frac{d}{c}, \frac{e}{d}, \frac{f}{e}, \&c. \;\;\ldots\ldots\;\; (A);$$

then if there ever arrive a term of the series (A), from and after which all the terms are not only less than unity, but tend towards a limit which is less than unity, the series is certainly convergent: but if the terms aforesaid become greater than unity, and continue so from and after a given term, the series is certainly divergent: and if the limit in the first case be not less than unity, but unity itself, the series may be either convergent or divergent, and each particular case must be examined by itself. Instances of both sorts can be given; and we know of no general rule for distinguishing between them, except the following, which includes all the cases we have seen, though we do not give it as a demonstrated test. Let the nth term of the series be N; and find a such that n^a N shall have a finite limit when n increases without limit. Then if a be greater than unity, the series is convergent; if equal to, or less than unity, it is divergent.

4. Series of the form $a + bx + cx^2 + dx^3 + ex^4 +$ &c., can always be made convergent by giving a sufficiently small value to x, except only in the case where the terms in the series (A) increase without limit from and after any term. If they do not increase without limit, let L be the limit; then the preceding series is convergent whenever Lx is less than unity, is referable to the preceding case when Lx is equal to unity, and divergent when Lx is greater than unity. But if L = 0, the preceding is always convergent.

5. Series whose terms are alternately positive and negative, are always convergent when the terms diminish without limit, and the error committed by taking any number of terms to stand for the whole value, is never so great as the first term thus rejected. For instance, if the answer to a question be $1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} +$ &c., then 1 is not wrong by $\frac{1}{2}$, $1 - \frac{1}{2}$ is not wrong by $\frac{1}{3}$, $1 - \frac{1}{2} + \frac{1}{3}$ is not wrong by $\frac{1}{4}$, and so on. The results are alternately too great and too small.

6. When such a series as the last has its terms not diminishing without limit, but towards a finite limit, the sum of any number of terms, increased by half the limit, is never wrong by so much as the first-rejected term differs from the limit.

7. When series produced by algebraical development have their terms alternately positive and negative, the error committed by stopping at any term is never so great as the first rejected term, even though the series become afterwards one of continually increasing terms. If then such a series have the first few terms rapidly diminishing, a close approximation may be made by means of them to the real value of the expanded function. For instance, in the series $1 - 2x + 2.3x^2 - 2.3.4x^3 + \ldots$ (in which an attempt to calculate from the whole series would be utterly futile, since however small x may be, there must be terms of every degree of magnitude) when x is small, an approximation may be made to its value from the terms which decrease. Thus if $x = \cdot 1$, in which case the series is

$$1 - \cdot 2 + \cdot 06 - \cdot 024 + \cdot 0120 - \cdot 00720 + \&c.,$$

(and the first term which surpasses that preceding, is $2.3.\ \ldots\ 11\ x^{10}$): the aggregate of the terms up to $2.3\ \ldots\ 9x^8$ inclusive, will not differ from the true value of the expression by so much as $2.3\ \ldots\ 10x^9$ or $\cdot 0036288$. The proof of this curious proposition may be deduced from Lagrange's Theorem on the Limits of Taylor's Series. (*Lib. Usef. Knowl.*, Differential Calculus, page 73.)

Series which are functions of x, may be divided into—1. Those which are sometimes convergent, and sometimes divergent, such as the development of $(1 + x)^n$; 2. those which are always convergent at last, but in which the appearance of divergency (increasing terms) may be continued as long as we please, such as the development of ϵ^x; 3. series which are always divergent, but to which a similar appearance of convergency can be given, such as $1 + 2x + 2.3x^2 + \ldots$, and the like; 4. Series which are always convergent or always divergent, and never can be made to exhibit any symptom of approach to the other state, such as

$$x + \frac{1}{x} + \left(x^2 + \frac{1}{x^2}\right) + \ldots \text{ and } \frac{x}{1+x^2} + \frac{x^2}{1+x^4} + \ldots$$

The series which are always convergent, both in reality and appearance, and upon which, therefore, an arithmetical algebraist would reckon with most security, do, in fact, offer difficulties of a very peculiar character. They are the

only ones in which the usual algebraical generalizations would lead to absolute error (so far as has yet appeared). On this subject generally, see Peacock's 'Algebra,' and 'Report on Analysis,' (*Rep. Brit. Assoc.*, vol. ii.); Cauchy, 'Cours d'Analyse;' Grunert, 'Supplemente zu Klugel's Wörterbuche der Reinen Mathematik,' in the article Convergenz der Reihen; 'Encyc. Metrop.,' article Calculus of Functions.'

CONVERSE, in logic and mathematics, means a proposition which is formed from another by interchanging the subject and predicate, thus: the converse of 'Every A is B' is 'Every B is A.' But care must be taken to put the proposition in its simplest logical form before conversion. Thus the converse of 'Every A has a B' is not 'Every B has an A.' For the proposition first stated is

Every [A *subject*] [is *copula*] [a thing which has a B *predicate*.]

and the converse is 'Every thing which has a B is an A.'

Of the four forms to which all assertions can be reduced, namely (A) 'Every A is B'; (E) 'no A is B'; (I) 'some As are Bs'; (O) 'some As are not Bs', the logical converses (so called) are those in which the new subject appears with the same degree of generality of assertion as the old one. Thus the converse of 'Every A is B', is '*Every* B is A.' Consequently in the first and fourth forms, or the general affirmative and the particular negative, the logical converse is not necessarily true. Thus 'Every A is B,' does not give 'Every B is A' *necessarily*, but only 'some Bs are As'. The latter is called by writers on logic conversion *per accidens*, a term which, as Dr. Wallis has declined to explain it, we shall leave as we find it, adopting the phrase diminished or limited conversion, and calling the first kind simple conversion. The only other method of conversion which has a definite name is that in which the subject and predicate are made contradictory to the former ones, as when we convert the proposition, 'All equilateral triangles are equiangular triangles,' into 'All triangles not equiangular are triangles not equilateral.' This is called conversion by contra-position. Restricting ourselves to converses which are necessarily as true as the direct propositions, we have the following rules with respect to A, E, I, and O above.

E and I are simply convertible.

E and A are convertible by diminution.

A and O are convertible by contra-position.

Nothing is more apt to make a beginner believe that 'Every A is B' yields 'Every B is A,' than the study of geometry without close attention to the meaning of terms and the force of the parts of an assertion. For as a majority of the earlier propositions have their simple converses true, the student does not sufficiently reflect upon this being contingent and not necessary.

In mathematical propositions there is a species of conversion which has no name, consisting in the interchange of the predicate with a part only of the subject. Thus if P, Q, R, and S be four circumstances, of which the existence of any three makes the fourth also exist, we may observe this species of conversion in passing from the first to the second of the following propositions:—

Every (thing which gives P, Q, and R) is (a thing which gives S).

Every (thing which gives P, Q, and S) is (a thing which gives R).

Thus of the following set of circumstances: 1. That two figures be parallelograms; 2. That they be equiangular; 3. That the sides about equal angles be reciprocally proportional; 4. That the areas be equal: exhibit the possibility of this conversion. For (1) (2) and (3) give (4); (1) (2) and (4) give (3); (1) (3) and (4) give (2).

There is an important logical proposition which would save some theorems in Euclid, and give a much clearer view of some of the arguments. It is evidently most desirable, when a proposition is a purely verbal and logical consequence of another, that it should be known to be such, and its proof distinguished from those which do *not* merely develop implied propositions.

Suppose, for instance, that a certain thing must be either an A, a B, or a C, but cannot be two of them; and that each, A, B, and C, must be either a P, a Q, or an R, but cannot be two. Suppose also that each P, Q, or R, must either be A, B, or C. If then it can be proved that every A is P (and not Q or R) every B is Q, &c., and every C is R, &c. the simple converses necessarily follow; namely, that every P is A, every Q is B, and every R is C. These converses are usually proved in Euclid by a *reductio ad absurdum*. [ABSURDUM, REDUCTIO AD.] For instances see book i. prop. 19, 25.

The proof of the converse is generally in Euclid a *reductio ad absurdum*. The necessity for this undoubtedly arises from the restrictions of geometry. [EUCLID.] If it were permitted to turn a triangle round till it recovers its first plane again, and then to compare it with the original triangle, the indirect demonstrations of the first book would be avoided for the most part. It seems a fanciful distinction to allow a triangle to revolve in its own plane, as in book i., prop. 4, and to refuse to admit revolution about a line in the plane. The subject of converses is discussed by Aristotle, 'Analytic. Prior.,' i. cap. 2, &c. See the editions of the 'Organon,' by Pacius, 1597, &c.

CONVEX. [CONCAVE.]

CONVEYANCE (in Law) is a deed or instrument in writing which passes real or personal property. The only conveyances used in the earlier periods of English history seem to have been feoffments and grants, though leases were soon used to pass a limited interest. The possession of land, as well as property of a movable nature, passed by tradition or actual transfer. The possession of land was given symbolically, by the delivery of a twig, a turf, &c., the charter of feoffment being the evidence merely of the transaction, and not essential to its validity. Hence, in the charter of feoffment, the operative words, or those which expressed the gift or transfer of the property, were used in the past tense, *hath given*, &c.: these terms are still used by some practitioners, although the reason for them has long since passed away.

A grant was applied to the conveyance of incorporeal hereditaments which did not admit of actual delivery into possession. From this difference in their application, a diversity was supposed to exist in the innate qualities of the two modes of conveyance, the feoffment being used to convey the actual possession of land, and operating upon the possession without any regard to the estate or interest of the feoffor; the grant to transfer the right of the grantor to the grantee: the former is frequently defined as a tortious, the latter a rightful conveyance. This definition however does not appear to be correct, and the tortious operation of a feoffment has been controlled and even denied in several recent decisions, Sir James Mansfield (in Goodright *v.* Forrester, 1 Taunt. 613) observing, 'Our ancestors got into very odd notions on these subjects, and were induced by particular causes to make estates grow out of wrongful acts.'

Sir William Blackstone distinguishes conveyances as original or primary, which are those by means of which the benefit or estate is created, or first arises; and derivative or secondary, whereby the benefit or estate originally created is enlarged, restrained, transferred, or extinguished. This division however is of little practical importance. Conveyances operate either according to the rules of the common law, or under the statute of uses; and in the case of a lease and re-lease, in both modes: and this latter is the most usual modern mode of conveying land and hereditaments. Conveyances may be further divided into those made by matter of record and by deed. As examples of those by matter of record, we may mention private acts of parliament, and the king's grant; and, until those modes were abolished by the recent statute 3 and 4 Will. IV., c. 74, fine and recovery. Those by deed are by feoffment, grant, bargain, and sale, covenant to stand seised, lease, release or confirmation, exchange, surrender. Conveyances simply transferring personal property are called assignments.

By the statute 13 Eliz., c. 5, voluntary or fraudulent conveyances of real property are rendered void, as against the creditors of the party making the transfer; and the 27th Eliz., c. 4, extends similar, and in some instances more extensive, relief to subsequent purchasers of the same property, although they may have had notice of the prior conveyance. The bankrupt and insolvent laws also provide for the relief of creditors against certain conveyances of real and personal property in derogation of their claims, or made within a specified time previous to the bankruptcy or insolvency.

In the session of 1836 a bill was introduced into the House of Lords by Lord Lyndhurst to simplify the conveyance of real property, but it did not pass into a law. Its object was to abolish the use of the lease in conveyances by lease and release. In Ireland a somewhat similar but

less effectual provision was made by the Irish statutes, 9 Geo. II., c. 3, sec. 6, made perpetual by the 1 Geo. III., c. 3, which enacted that the recital of the lease should in all cases be sufficient evidence of it.

In many of the states of North America a simple bargain and sale is the usual mode of conveying real property. In New York it is called a grant; and the conveyance by feoffment and livery of seisin, and also the statute of uses, are expressly abolished by the legislature.

Conveyances in Scotland are made according to the strict principles of the feudal law there established, which imparts to them the appearance of far greater specialty and quaintness than those used in modern English practice. (Bl. *Comm.;* Butl. *Co. Litt.;* Kent's *Comm.*)

CONVEYANCING is the business of preparing conveyances of real or personal property, of investigating the title of the vendors and purchasers of property, and of framing those multifarious deeds and contracts which govern and define the rights and liabilities of families and individuals. It is carried on by barristers, or members of the Inns of Court, who having kept twelve terms, obtain a certificate according to the provisions of the 9 Geo. IV., c. 49, and are called Certificated Conveyancers. The increased number of transactions in this branch of the law has rendered a division of labour, and a special course of study, necessary.

There are two opposite systems, by which the transfers and transactions of the owners of real property are capable of being carried on; and between the extreme points of which, in some portion or other of the intermediate ground, all existing systems must arrange themselves. In one of these systems, as in the present system of England, every transaction is accomplished and evidenced by means of instruments in writing, varying infinitely, and governed by a scientific and ascertained mode of construction. In the other, the effect is accomplished somewhat like the transfer of stock, by a comparatively mechanical operation, a process of book-keeping, of which the evidence is to be kept, not in private muniments, but in the ledger-books or registers of the State.

The respective objects of these systems are, in the one, to protect the rightful owner, in the other, the innocent purchaser. In the latter the State takes upon itself the duty of seeing to the title of the owner whom it admits to registration, and consequently takes upon itself the risk of being deceived; in the former, it leaves the parties to concert titles and transfers in secret and in silence, leaves them unrestrained and unchecked to transact with one another, but compensates this want of interference by the alternative of following the right, by its judicial machinery, against all parties, however ignorant, however innocent, who may have had the misfortune, at any time subsequent to a defective transaction, or wrongful succession, to become the owners or purchasers of the property; limiting that restoration or succession only by reference to certain durations of adverse possession. (Parke's *Lect.*)

In the time of the feudal law, and the period immediately succeeding, restraint was placed on every species of alienation; landed property was rarely the subject of barter. Every transfer of land took place in open court, that is, on the land itself *coram paribus* (before the pars or peers), who were the other tenants of the feudal lord, and who subscribed the instrument of investiture as witnesses (Sulliv. *Lect.*, p. 58); so that, in the words of Lord Mansfield, it was as notorious who was feudal tenant *de facto*, as who is now *de facto* incumbent of a living, or mayor of a corporation. Land was 'of a stubborn nature,' money portions were unknown, and personal property did not exist in sufficient quantities to be made the subject of settlement, and consequently conveyancing transactions were few and simple. But the devices of the ecclesiastics to evade the statutes of mortmain, the invention of uses and trusts, and subsequently the passing of the statutes of uses and wills, which enabled the possessor of land to provide for the contingencies which might occur in his family, and to mould his estate according to his whim or fancy, controlled only by the laws from time to time established to guard against the abuse of the privilege, the power of devising real estate, and the multifarious wants of a large and wealthy population, laid the foundation of the system of modern conveyancing. 'By means of this system,' says a late eminent professor, 'there is no device, arrangement, settlement, or disposition which imagination can conceive, or ingenuity construct, which the machinery of the law of England cannot carry into effect with certainty. There is no conceivable purpose to which property may not be applied or rendered instrumental, no event, or combination of events, which can possibly happen in a family, of whatever rank or number, which may not be provided for and met, by a family settlement framed by a master of his art.'

Modern conveyancing is conducted on principles which in general are well defined and accurately settled. Of this a remarkable proof was afforded by a statement in Mr. Parke's 'Contre-Projet to the Humphreysian Code,' p. 199, upon the authority of Mr. Preston, that of the cases which came before him (averaging thirty a week), three per cent. only went on to judicial litigation.

The great endeavour, from the earliest times, on the part of the owners of property, has been to be enabled to effect sales and dispositions with secrecy and dispatch, without incurring that publicity which it was the policy of the common law to enforce. Whether it be desirable, for the sake of mercantile credit, to favour secrecy, or promote publicity, in the sale and disposition of property, has been lately much discussed: a general registry has been proposed, and a bill for establishing it thrown out of the House of Commons. [REGISTRATION.]

CONVICTION. [JUSTICE OF THE PEACE.]

CONVOCATION, the assembly of the clergy in form of parliament under the authority of the king's writ, which takes place at the commencement of every new parliament. The tendency of the western states of modern Europe in political relations to become thrown into the form of which king, lords, and commons is no inapt type, is apparent in the ecclesiastical constitution of almost every country in which Christianity has been received and professed. The archbishop has had his suffragan bishops, and the bishops each his canons, who formed his council, in some of whom have been vested peculiar functions, as dean, archdeacon, and the like; while the great body of the clergy have had their meetings under the form of diocesan synods or provincial assemblies, in which they have been accustomed to discuss matters pertaining to the common interest and benefit of themselves or of the whole church. [BISHOP, CANON, CHURCH, CLERGY.]

These meetings, resembling as they do in some points the convocation of the English clergy in later times, might easily be supposed to be that assembly in its primordial state. But writers on this subject trace out the origin of the convocation in something more special than this. It is supposed that originally the clergy were thus called together by the king's authority for the purpose of assessing themselves in levies of taxes at a time when they contended for exemption from the general taxation of the country imposed by the authority of parliament. Like many other questions in our early constitutional history (we mean by 'early' when we ascend beyond the reign of King Edward the First), this is perhaps one of presumption and probability rather than of evidence and certainty. Such, however, the convocation is generally understood to have been in the reign of King Edward the First, rather than an assembly of ecclesiastics summoned to consult on things pertaining to the church, as the purity of its doctrine, the regularity of its ordinances, and the influence of its teachings and administrations.

When such an assembly was called together under the supreme authority of the state, it was natural that such subjects should be introduced, discussed, and in some instances determined by it; and even now, though the convocation may be said to exist rather in name than in reality, it seems to form the proper constitutional assembly in which to legislate on such subjects, whenever legislation upon them is needed.

The crown, however, had always in its hands the power of controlling this assembly, possessing as it did the prerogative of proroguing and dissolving. But at the Reformation an act was passed (25 Henry VIII., c. 19,) which expressly deprived the convocation of the power of performing any act which could make such an assembly dangerous to the public. It was restricted by it from making any canon or ordinance which was opposed to the king's prerogative, or to the laws, customs, and statutes of the realm.

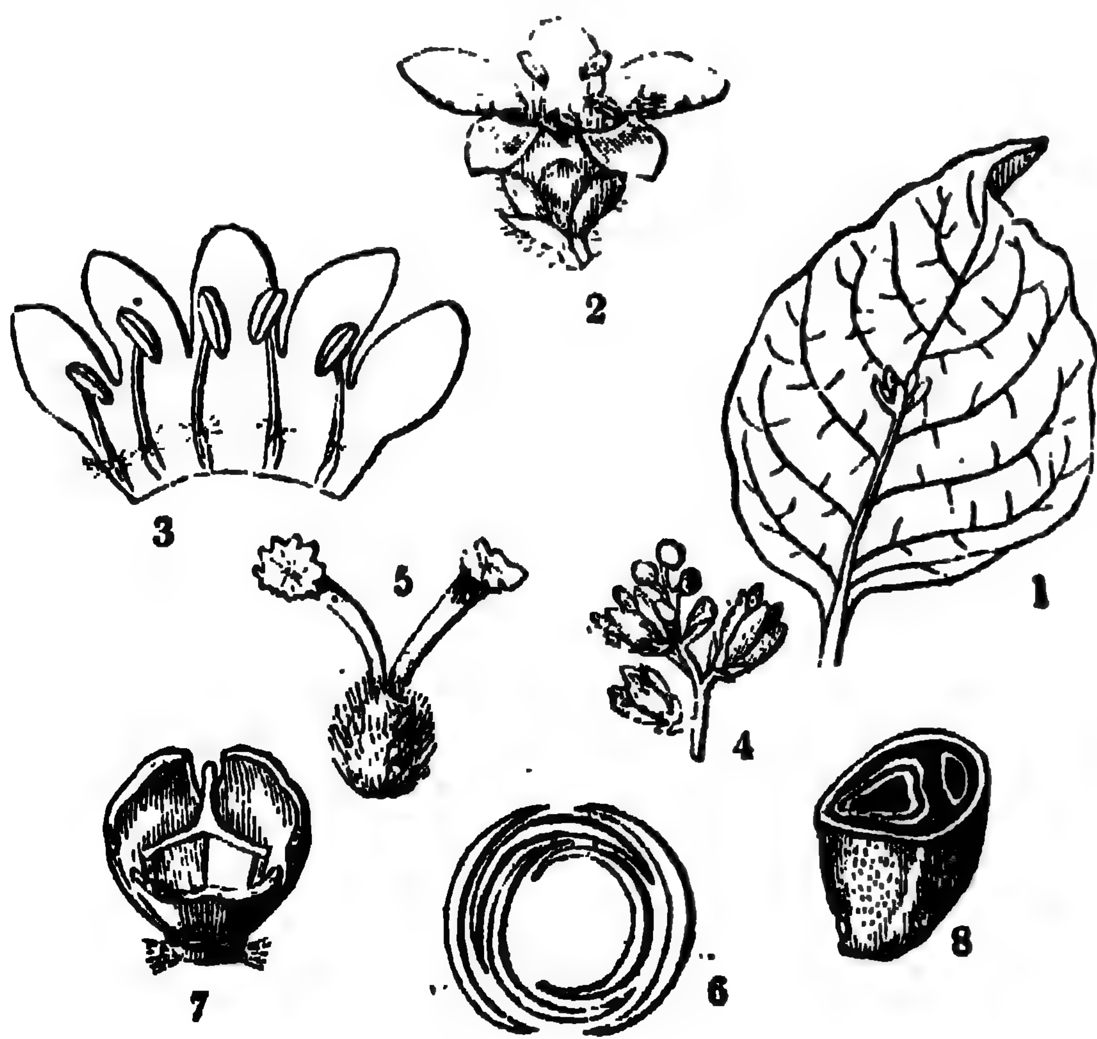
Again, in 1665, the clergy gave up the power of taxing themselves, consenting to fall within the scope of the statutes made in parliament for such purposes, like the laity,

when they received a right of voting with the laity in the election of knights of the shire.

But though virtually the convocation thus became almost a nullity, yet the practice has been continued, and continues to the present day, of summoning the clergy to meet in convocation whenever a new parliament is called; and the forms of election are gone through in the dioceses, and the meeting is held, usually in St. Paul's Church, when the form is gone through of electing a prolocutor or speaker. The king's writ is directed to the archbishops, commanding them to summon the bishops and the inferior clergy. The archbishop complies with this writ, summoning the bishops, and commanding them to summon the archdeacons and deans in their respective dioceses, and to command the chapters to elect one proctor each, and the great body of the clergy in each diocese two proctors, to represent them in the convocation. When assembled, they form two houses. In the upper house sit the bishops; in the lower, the other clergy, in all 143; viz., 22 deans, 53 archdeacons, 24 canons, and 44 proctors of the inferior clergy. It is the usual practice for the king to prorogue the meeting when it is about to proceed to any business.

CONVOLVULA'CEÆ, a natural order of monopetalous exogens, with bell-shaped flowers, opening or contracting beneath the influence of light, a plaited æstivation of the corolla, five stamens, and a fruit with two or three cells, in which one or two ovules stand erect. The embryo is crumpled up in the midst of very firm albumen. The common bind-weeds of the hedges, the Ipomœas and Convolvuli of the gardens, offer illustrations of the ordinary state of this order, the species of which have purgative roots, and in the case of scammony, yielded by Convolvulus Scammonia, and of jalap, produced by various species of Ipomœa, are of great medicinal importance. Occasionally the purgative principle is so much diffused among the fæcula of the root as to be almost inappreciable, as is the case in the Convolvulus Batatas, or sweet potato of America, which was the forerunner of the common potato, and gave it its name, and which is still cultivated in the south of Spain and France.

In most instances the stems of this natural order are twining, and in such cases it is immediately recognized; but occasionally they are erect and more spiny, and when that happens it is not so easy to know the order. If however attention is paid to the very imbricated state of the calyx, two of the sepals being quite exterior with respect to the other three, no real difficulty in identifying it need be experienced. For illustration we have taken a singular East Indian genus called Neuropeltis, in which the flowers grow from the midrib of the bracteal leaves: it would be superfluous to figure a bind-weed.



1, a bracteal leaf of Neuropeltis racemosa, with a flower growing from its midrib; 2, one of its flowers magnified; 3, a corolla opened, showing the stamens; 4, a small cluster of flowers; 5, one of its ovaries with two styles; 6, a section of the calyx of a Convolvulus; 7, half a capsule, with valves separating by their edge from the dissepiments; 8, a transverse section of a seed, showing a part of the embryo lying in the albumen.

CONVO'LVULUS, the genus of plants upon which the natural order Convolvulaceæ is founded, is known by its style being divided into two linear arms, and its ovary having only two cells, in each of which stand two erect ovules. Many of the species are exceedingly beautiful; even C. arvensis, the common bind-weed, would be prized as a lovely flower, if it were not so common, and such a troublesome plant to eradicate on account of its creeping roots. C. althæoides, italicus, and scammonia are the three prettiest of the hardy exotic species of the genus.

CONVO'LVULUS JALAPPA, and C. SCAMMONIA. The resins of the Convolvulaceæ, upon which these and other species depend for their activity as medicines, appear to be of two distinct kinds; the one soluble in proof spirit and insoluble in æther (found in jalap, turbith, and bind-weed), the other soluble both in alcohol and æther (found in scammony and C. soldanella). Jalap is chiefly shipped from Vera Cruz, and takes its name from the town of Xalapa, or Jalapa, in the interior. It is best when collected in March or April, before the young shoots have begun to be developed. The large root, which often weighs 50 pounds, is divided into portions, which are hung in nets over a fire, and dried in ten or twelve days. It occurs in commerce in irregular round or pear-shaped masses, which, when good, are dry, hard, with a brown shining fracture, resinous, not light, somewhat tough. It is often adulterated with portions of the root of white bryony, which however are white, or when old, gray, not heavy, very brittle, fracture not resinous, spongy, without smell, but with very bitter taste. Dried pears are also often substituted for it; but they may be detected by being laid open, when the core will be seen, containing the seeds. Analysed by Cadet de Gassicourt, 100 parts of the dry root yielded resin 10, gummy extractive 44, woody fibre 29, starch, albumen, salts of lime, and potass, &c. Its excellence depends upon the quantity of resin; a white jalap (from C. Mechoacanna) is sometimes met with, which contains only 2 per cent. of resin; its dose must be five or six times as great as that of the genuine jalap.

Jalap is ranged with the drastic purgatives, and where one of a resinous kind is desired, is that usually selected. Its action is generally certain, and when in combination with other substances, mild and speedy. It does not seem greatly to influence the nerves of the abdomen, but rather the vascular system of the pelvis and lymphatic system of the intestines. It is given in obstruction of the liver, vena porta, and diseases connected with these organs, such as hypochondriasis, melancholia, jaundice, dropsy, and intermittent fevers; but at the commencement of common fevers, along with calomel, it is of great utility; also in the inflammatory or turgescent stage of hydrocephalus, and in the treatment of worm cases.

Scammony is of the same nature as jalap, but being the inspissated juice obtained by making incisions into the living root, it consists of a much larger proportion of resin, without any woody fibre. It is therefore much more powerful, and the dose requires much less than that of jalap. Three kinds are met with: the best from Aleppo contains 60 per cent. of resin, with 35 per cent. of impurities; second sort from Smyrna, contains only 29 per cent. of resin and 58 of impurities; the third sort, from Antioch, is very bad. In France a so-called scammony, obtained from the Cynanchum monspeliacum, is very bad, and dangerous to employ. Scammony is used in nearly the same cases as jalap, and the smaller bulk of the dose renders it in many instances preferable: it often sits better on the stomach; no medicine surpasses it in clearing away the mucous accumulations in the bowels of children, which harbour, if they do not generate, worms. It should not, however, be too frequently repeated, as its power in this respect renders it a source of danger, by abrading the inner coat of the intestines of its necessary mucous covering, and thereby causing it to become inflamed. [CATHARTICS.]

CONVOY, in the military service, is a detachment of troops appointed to guard supplies of money, ammunition, provisions, &c., while being conveyed to a distant town, or to an army in the field, through a country in which such supplies might be carried off by the peasantry or by parties of the enemy.

In the navy, the name is applied to one or more ships of war which are ordered to protect a fleet of merchant-vessels on their voyage.

CONVULSIONS, irregular (anormal) and violent con-

tractions of muscular fibres with alternate relaxations. The muscles of the body are divided into two great classes, those which produce the motions necessary for the due exercise of the organic functions, and those which produce the motions necessary for the performance of one of the animal functions, namely locomotion. The first division comprehends the class of the involuntary, and the second that of the voluntary muscles. Contractility, the property of shortening itself on the application of a stimulus, is the proper function of the muscular fibre,; and by this property all vital motion of every kind which takes place in the living system is performed. [MUSCLE.]

The property of contractility is inherent in the muscle; but the manifestation of this property is wholly dependent on the nervous influence; for if the nervous influence be abstracted from a muscle, its fibres are incapable of contracting, whatever degree of stimulus be applied to them. When the muscular fibre is in a sound state, and is supplied with the nervous influence in proper quantity and of proper quality, the fibre contracts with a given degree of force on the application of a certain amount of stimulus. This degree of contraction constitutes its regular or normal action. Contraction, after it has continued a certain time, is succeeded by relaxation; relaxation, in its turn, yields after a given time to another contraction; this contraction to relaxation, and so on successively according to the order proper to muscular action when natural and sound. [MUSCLE.]

But when, on the application of a given stimulus, the muscular contraction is either more violent or more rapid, or longer continued than natural, that is, when it does not yield in proper time to the alternate state of relaxation, the muscular action is said to be convulsive, and the disease termed convulsion is induced. The state of convulsion is also produced when the muscular fibre is excited to inordinate action on the application of a stimulus not natural to it. The function ultimately deranged in convulsion is the muscular contractility; but the function proximately deranged is the nervous influence; the manifestation of disease is in the muscular, but its true and proper seat is in the nervous system.

Both divisions of the muscular system, the voluntary and the involuntary, are subject to this irregular and violent action. When the muscles of animal life, or those of voluntary motion, are thus affected, it constitutes the disease called convulsion in its true and proper sense; when the muscles of organic life, or those of involuntary motion, are thus affected, the disease is usually termed spasm. This distinction is not indeed invariably and universally observed by medical writers; but it would be very convenient if it were so. When the muscle is rigid and tense, and its contraction is persistent, not quickly alternating with relaxation, the contraction or spasm is called tonic; when the contractions rapidly alternate with relaxations, the convulsion or spasm is called clonic. In the first, the vital energy of the muscle is in excess; in the second it is deficient. When the convulsive or spasmodic action is of the clonic kind, but instead of being violent is slight, and when very slight contractions rapidly alternate with relaxations, it constitutes what is called *tremor*.

Convulsions differ, first, in kind, as dependent on an excess or a deficiency of vital energy; secondly, in degree; varying from the most powerful, violent, and persistent contractions, without perceptible relaxations, or with relaxations of very short duration, down to the feeblest contractions, with the most rapid alternate relaxations of the slightest tremor; thirdly, in their seat, affecting either the voluntary or the involuntary muscles, or both simultaneously or in succession; fourthly, in their cause, arising from a primary affection of the nervous system, or from irritation propagated to the nervous system from some other part (primary or secondary); fifthly, in their extent; affecting one part separately, or nearly the whole frame simultaneously (local or general); and sixthly, in their character (simple or specific): simple, when unattended with phenomena which give them a determinate type, that is, when the phenomena consist merely of convulsive or spasmodic action; specific, when the convulsive actions pursue a regular and determinate course, and when, moreover, some particular phenomenon is superadded to the series constituting a distinct form or type of disease. In this latter case the disease receives a generic name. The term epilepsy, for example, is given to the disease when the convulsions come on in a peculiar mode, and pursue a determinate course, and when there is present the superadded phenomenon of insensibility or sopor. On the other hand, in the affection called hysteria, the convulsions come on in a different mode, pursue a different course, and are attended with a different but still a determinate train of morbid phenomena. In these cases convulsions forming the species of disease, the series of determinate morbid phenomena constitute so many different genera under it.

Voluntary muscles are far more frequently the seat of convulsions, properly so called, than the involuntary muscles. The diaphragm, indeed, an involuntary muscle, next in importance to the heart, is often affected with a proper convulsive action, constituting the disease called singultus or hiccup; and the heart itself appears to be occasionally affected with a proper convulsive action, in some of the forms of palpitation, for example; but in general, when the organs of the organic life, as the bronchi, the stomach, the intestines, the urinary bladder, the uterus, &c., are attacked with an affection of this kind, it is much more closely allied, as has been stated, to the nature of spasm than of convulsion.

Of the voluntary muscles, whether those appropriated to locomotion, or those destined to act on foreign bodies under the command of the will, and also of certain muscles which, though not under the direct command of the will, still belong to the animal life, having a close relation either to sensation or emotion, there is not one which may not be the seat of convulsion, singly, or conjointly with many others.

The muscles of the eyelids, the muscles that move the ball of the eye, the muscular fibres of the iris, the muscles of the face, and more especially of the lips, the muscles of the tongue, the muscles of the pharynx, the muscles of the jaws, and particularly of the lower jaw, the muscles of the neck, the muscles of the chest, back, and abdomen, and the muscles of the upper and lower extremities, may be severally attacked singly or in combination, simultaneously or in succession, with every degree of convulsion, from the most violent tonic contractions to the slightest clonic tremors or twitching. The particular muscles affected, the particular combinations of the muscles affected, the particular order in which the muscular affections succeed each other, may be indicative of specific diseases of the nervous system or of diseases seated in particular parts of the nervous system. The study of these convulsive affections is therefore most important in a practical point of view, as indicating, at one time, the near approach or the actual existence of highly dangerous diseases, having their primary seat in the brain or in the spinal cord; and at another time pointing to no less formidable diseases of the brain and spinal cord excited by diseases of some distant organ.

When convulsions attack a single muscle, or a particular set of muscles, the convulsions are called partial or local; when they attack a great number of muscles simultaneously or in rapid succession, they are called general.

The accession of convulsions, whether local or general, is commonly, though not invariably, preceded by premonitory signs. An attention to such premonitory signs, when present, as they will almost always be found to be, if carefully looked for, is of the last importance; because it may lead to the adoption of means which may prevent the attack. Among the most common and decisive premonitory signs of an approaching attack of convulsions may be enumerated, flushing of the face, or the opposite state, an unusual pallidness of the countenance; giddiness; noise in the ears; spectra floating before the eyes; sudden and transient loss of sight or of hearing; unusual drowsiness, or the contrary state of sleeplessness and restlessness; a sensation of coldness creeping down the back or pervading the limbs; sickness or nausea at the stomach; palpitation of the heart; hurried irregular respiration; tendency to sigh; a sensation of faintness; torpor or despondency of mind, and an unusual irritability of temper. It is rare, that some one or more of these or of other analogous signs do not give warning of the approach of the paroxysm. The presence of such signs should therefore not only not be neglected, but, wherever there is a predisposition to the disease, should be carefully looked for, that measures appropriate to the particular nature of the case may be promptly taken to prevent an occurrence of the attack.

In the actual paroxysm, the features of the face are sometimes hideously distorted; the eyeballs are prominent, staring, vacant, wild, and are rolled in every direction; the

teeth gnash; the mouth foams; the tongue protrudes; and the action of inspiration from the passage of the air through the clenched teeth, is attended with a hissing sound. So violent are the contractions, that occasionally the teeth and sometimes even the bones of the extremities are broken by the force. When the muscles of respiration are involved, and the respiratory function is much obstructed, the face becomes tumid, bloated, and of a dusky or purple colour; and sometimes even the entire surface of the body assumes a leaden hue, from the obstructed circulation through the lungs and the imperfect aëration of the blood. Such is the obstacle to the progress of the blood, that the blood-vessels sometimes give way, and the blood bursts from the nose, or is effused extensively beneath the skin, the effusion probably preventing irreparable mischief to the brain. At other times the face, instead of being red, is pallid and sunk, and then the pulse is feeble, small, and contracted; as in the former case it is full and strong, and attended with a violent beating of the carotids. The violent contractions of the muscles act upon the bladder and rectum, and expel their contents involuntarily and with force. In all the cases in which the current of the blood is much obstructed, the functions of the brain are proportionally impaired, the general sensibility is diminished, and there is sopor, or even coma; at other times consciousness is but little affected, and the violence of the contractions produces severe pain.

The duration of the paroxysm varies from a few minutes to as many hours. The moment the convulsions subside, the patient commonly falls into a long and profound sleep, from which he awakes suddenly, altogether unconscious of what has happened. The attack is generally succeeded by languor, lassitude, sickness, and a disordered state of the stomach.

The paroxysm commonly returns at uncertain intervals, preceded by the premonitory symptoms just enumerated. But sometimes it proves fatal at the very first attack, by producing apoplexy or asphyxia; and not unfrequently it leaves behind it either paralysis or some definite and permanent form of convulsive disease, as epilepsy, chorea, and so on. The frequent recurrence of the fits invariably impairs, and sometimes wholly destroys, the mental faculties.

In some peculiarly nervous and irritable temperaments, instead of the languor and lassitude which ordinarily follow a severe convulsive paroxysm, the exhaustion is so extreme that the patient falls into a state of profound syncope or fainting, which continues for so long a period as justly to excite alarm; and sometimes the patient actually dies in this fainting fit, the brain never recovering its functions. At other times, when the animal life is completely suspended, and the action of the organic life appears to have ceased, but the latter is not wholly extinguished, though its functions are performed so feebly as to afford no indication of their existence; and consequently, to all outward appearance the patient is dead; yet he may be only in a state of lethargy or torpor, and may ultimately revive. It is in cases of this kind that there is a real danger of premature interment. Several cases are on record in which this event is stated to have actually happened, and the evidence on which the truth of some of these narratives rests it is difficult to resist. At all events it is quite certain, that several persons who had fallen into the state of syncope, after the exhaustion of convulsions, have narrowly escaped being buried alive; and such cases should make the medical attendant persevere in the most careful examination of every instance of apparent death, after a convulsive paroxysm, until he has observed the most unequivocal evidence that death is real.

The preceding account of a paroxysm of convulsion, is the description of it only as it exists in its severest form. In general even the tonic seizure is a much more mild attack; the convulsions being not violent; affecting only a few muscles at a time, and rather passing in succession from one set of muscles to another, than attacking a great number simultaneously. In general too the convulsions are unattended with the obstruction of respiration; are without the abolition of sensation; in short, are without the permanent and dangerous interruption of any function, organic or animal. And more especially when the paroxysm is of a clonic character, the muscles are not rigid, the contractions are not vehement and long-continued, the face is not swollen and livid, but rather pale and sunk, the features are little distorted, the pulse is feeble and rapid, and the extremities are cold.

Convulsions are frequently excited in the progress of other diseases, towards the termination of continued fevers, for example, in which they are almost always of bad, and sometimes of fatal omen; at the commencement of eruptive fevers, as small-pox, measles, scarlet fever, &c., when, though generally indicative of a severe form of disease, they are not so alarming as at the close of continued fever; in inflammatory affections of the brain; in hooping-cough: in cramp; in disordered states of the reproductive organs, and more especially of the uterus, and in long-continued suppression or imperfect performance of the catamenial function.

The causes of convulsions are exceedingly numerous and varied. There is, without doubt, a constitutional predisposition to such affections. They occur far more frequently in the nervous temperament than in any other. The distinctive character of the nervous temperament is muscular mobility combined with nervous irritability. The muscular fibre is relaxed, delicate, and weak; the nervous fibre is peculiarly sensitive, while it is proportionally without energy. Other powerful causes are, peculiar conformation of the body, namely, a feeble frame, with a largely-developed head; a relaxed and delicate fibre; a full and plethoric habit; a constitution often manifestly propagated from parent to child; all circumstances capable of producing over-excitement, or in any other mode of inducing debility, physical or mental; as an idle and luxurious mode of life; too much indulgence in sleep; neglect of regular and active exercise, and, as would appear, certain electrical conditions of the air, by which the nervous system is rendered more susceptible of impressions, and its vital energy is more rapidly exhausted.

The exciting causes are those which act either upon the animal or upon the organic portion of the nervous system. It has been stated that contractility, though a property inherent in the muscular fibre, can be excited only through the agency of a stimulus derived from the nervous system. All the muscles which are under the control of the will, or which depend on an act of volition for the exercise of their function, derive their nervous stimulus from a particular portion of the nervous system, namely, the spinal cord. Modern physiology has demonstrated that the nervous fibres which supply the stimulus necessary to voluntary muscular motion are different from the nervous fibres which communicate sensation. The first, the motive nerves, communicate with a particular portion of the spinal cord: the second, the sentient nerves, communicate with another portion of the spinal cord. Now, it is found that whatever disturbing influences act immediately upon the motive nerves, or upon that portion of the spinal cord with which the motive nerves are in direct communication, constitute most powerful exciting causes of convulsions. But there is so close a sympathy between the sentient and the motive portion of the spinal cord, and between the spinal cord and the brain, that any disturbing influence which acts powerfully on the one is rapidly communicated to the other. It is indeed seldom that it is possible to trace the seat of the irritating cause either to the motive or to the sensitive portion of the nervous system exclusively; that would imply an accuracy and completeness of knowledge which pathologists are at present far from possessing. All that the present state of knowledge almost ever admits of is to trace the seat of the irritating cause to some portion of the spinal cord or brain; and this, which is nearly all that can be done in any other case, is sufficient to connect the morbid condition of the organ with its disordered function. There are then morbid conditions of the spinal cord and brain which are clearly ascertained to be immediately connected with that disorder of their functions of which convulsions are the result.

Such are, 1. A disordered state of the circulation of the blood through these organs. One of the conditions the most essential to the due performance of the functions of the nervous system is, that the spinal cord and brain receive a certain supply of arterial blood. If the quantity of blood which flows to these organs be deficient, syncope will be induced, with a diminution or loss of muscular power: of this state convulsions, always of a clonic character, are a constant result. If the blood transmitted to the spinal cord and brain do not circulate through the blood-vessels with a certain impetus and velocity, but be retained either in the capillary arteries or veins, or in both, the state termed congestion [CONGESTION] will be induced, of which convulsions, also in general of a clonic character,

are a constant result. If the blood sent to the spinal cord and brain be in preternatural quantity, and if it circulate with preternatural energy, the state of inflammation will be induced, of which convulsions, always of a tonic character, are a constant result. Whether, then, the balance of the circulation be disturbed by deficiency or excess in the quantity of the circulating blood, or deficiency or excess in the motion of it, it will prove alike an exciting cause of convulsions. 2. Precisely the same results are produced if there circulate through the blood-vessels blood vitiated in quality, blood too much venalized, or too much arterialized, or impregnated with poison. The characters of the convulsions induced by exciting causes of this class vary essentially according to the nature and extent of the vitiation of the blood and the kind of poison with which it may be imbued. 3. Extravasation of blood upon the surface or into the substance of the spinal cord and brain, by the rupture of the blood-vessels; or the effusion of the serous portion of the blood, occasioning direct pressure on the nervous matter. 4. Organic changes in the constitution of the nervous substance, as a preternatural softening or a preternatural hardening of it. 5. Morbid growths within the nervous substance, forming tumours of various natures and sizes. 6. Mechanical injury of the nervous substance, from the irritation occasioned by the deposition of bony matter on the investing membranes of the nervous substance, or from spiculæ of bone growing out from the inner table of the osseous cases that inclose it. 7. Mechanical violence directly applied to the nervous substance, as from a blow or fall, by which a shock, exhaustive of its vitality, may be communicated to it, or its substance injured or its circulation disturbed. Such are the more powerful exciting causes which act directly on the animal portion of the nervous system.

But convulsions may be equally induced by the action of an irritating cause on the organic portion of the nervous system. The irritation excited in the organic nerves is transmitted to the communicating branches of the spinal and cerebral nerves, and is by these communicating branches conveyed to the spinal cord or brain. It is in this manner that irritating substances in the stomach or in the intestines induce convulsions, as indigestible or acrid substances taken as food, or acrid matters generated or evolved during the digestive process, or retained by long-continued constipation [CONSTIPATION] in some part of the alimentary canal; or the accumulation of acid, or the presence of worms, &c. Many other noxious agents which act upon one or other of these nervous circles, or upon both conjointly, might be enumerated as the exciting causes of convulsions; but those which have been stated may suffice to indicate the kind of noxious agents which induce this affection, by disturbing the functions of the nervous system.

The treatment in every case of convulsion must be directed to the subduing of the paroxysm and to the prevention of its return. There are certain things proper to be done the instant a person is seized with a fit of convulsions, with a knowledge of which it is desirable that every one should be familiar. The patient should be immediately surrounded as completely as possible with fresh cool air. If he be seized in a small heated and crowded room, circumstances of themselves sufficient to produce a paroxysm in a person strongly predisposed to it, he should be removed into a spacious apartment, the windows of which should be thrown open, and every one whose assistance is not absolutely required should be excluded from the room. In the male, the neckcloth should be immediately untied, and the face, neck, and bosom freely exposed to the air; in the female, the stays should be unlaced, and every thing tight about the body should be removed. If the skin be cool and the face pallid and sunk, the patient should be placed in the horizontal posture; if the skin be hot and the face flushed, he should be sustained in the sitting or the erect posture, in order, in the former case, to favour the flow of blood to the spinal cord and brain; and in the latter, to retard it.

The remedies employed to put an end to the fit must of course depend on the nature of the exciting cause, and on the pathological condition of the nervous system. If the vascular action of the nervous system be highly excited; if the pulse be rapid, full, and strong; if the skin be hot, and the face flushed; if the eye be injected, wild, and glistening, means must be taken the very opposite to those which are proper when the circulation is depressed, the pulse rapid and feeble, the skin cool, the face pallid and sunk, and the eye dull, heavy, and expressionless. The experienced eye of the observing and discriminating practitioner will gather at a single glance, from the presence or absence of sopor, from the presence or absence of the signs, familiar to him, of active or passive congestion [CONGESTION], from the action of the carotid arteries, from the temperature of the skin, from the plethoric habit of the body, and from the character of the convulsions, almost all the information necessary to determine the first steps to be taken. Whether it be necessary to employ the lancet vigorously, opening a large orifice in the vein of both arms at once, or opening the jugular vein, or the temporal artery, or whether it be more desirable to have recourse to revulsive bleeding, by opening the veins of the feet, retaining the feet in warm water, or to employ topical depletion, by cupping behind the ears, at the nape of the neck, or between the shoulders; or whether the very opposite treatment be required, and life itself depend, as it sometimes does, on the administration of stimulants, restoratives, antispasmodics, opiates, he will be clearly taught by symptoms, which only perplex and confound the ignorant and the undiscerning. Not only the shortening of the paroxysm, but the preservation of life, will constantly depend on his perception of the right, among apparently opposite indications; on the promptness of his decision, and the energy of his action. There are few departments of medicine in which more care and skill are required to make the proper selection, and to adopt the most advantageous mode of exhibiting even the auxiliary remedies, namely, the application of cold and heat, the administration of purgative medicines: the application of counter-irritants, &c. If possible, a still higher demand will be made on professional knowledge and judgment, to detect the organs whose altered structure or diminished function are the cause of the disease, and to discriminate their exact pathological condition. Unless a sound conclusion be arrived at on these points, no rational course of treatment can be pursued, and it is more than probable that the very agents employed to cut short the paroxysm will increase the danger, and that the course adopted to prevent the return of the fit will facilitate and hasten its recurrence. It is impossible in this place to enter on a field of professional investigation so extensive and important; it is one on which the labours of modern pathologists have shed great light; and it is the duty of every medical practitioner diligently to study their works, that he may collect every scattered ray to guide him through a course in itself difficult and intricate, and in which, if he err, the consequence must always be mischievous and often fatal.

CONWY. [CAERNARVONSHIRE.]

COOCH BAHAR, a principality occupying the north-east extremity of the province of Bengal, and lying between 26° and 26° 30′ N. lat., and between 88° 52′ and 89° 52′ E. long. This principality, which once formed the western division of the antient kingdom of Camroop, has long been in a state of absolute dependence on the English government, to which an annual tribute is paid to the amount of half the revenue, and for the purpose of securing this tribute, the principality has been placed under the controul of the collector of the adjoining district, Rungpore. The extreme length of the principality from east to west is sixty miles, and its mean breadth about twenty-two miles, the total area being 1302 square miles.

The distinctive name, Cooch, has been given in order to mark the difference between this principality and the province of Bahar (described vol. iii., p. 276). This name, Cooch, is derived from that given to the majority of the inhabitants. The name of Cooch Bahar is displeasing to the chiefs of the country, who repudiate all connexion with the Cooch, and call themselves *Rajbangsies* (descendants of princes). Many of the Cooch tribes have relinquished the practices of their ancestors, which were characterized by various impurities, and have adopted the Brahminical faith; while others who inhabit the northern quarter of the principality, near to the frontier of Bootan, continue rude and barbarous in their habits. Their religion allows them to eat pork, mutton, venison, and poultry, but not beef; some of the more barbarous among the tribes not only eat beef, but frogs, cats, dogs, and snakes.

The southern parts of the principality are much improved by culture, and of considerable fertility; but in the north the country is low and marshy, and contains abundance of

thick jungle. A considerable quantity of opium is produced, as well as indigo, and some cotton. Wheat is cultivated, and a little barley. Trade between the principality and the adjoining British territory is perfectly free, and the people have also commercial dealings with Asam and Bootan. Among the more indigent classes in the north, it is customary for the people to sell their children for slaves, although this traffic is much discountenanced by the English government.

The sovereign of this country is described in the Ayin Akbari as having been a powerful chief, at the head of an army of 1000 horse and 100,000 foot soldiers, and having Asam and the whole kingdom of Camroop under his sway, his territory being bounded on the east by the Bramahpootra river, on the south by Gorhaghaut, on the west by Tirhoot, and on the north by the Thibet mountains. This country was conquered by the Moguls about the year 1660, and subjected to an annual tribute of ten lacs of rupees. In 1772, when the East India Company had succeeded to the rights of the Mogul emperor, the rajah of Cooch Bahar applied to the collector of Rungpore for protection against the attacks of the Bootaners, by whom he had been reduced to great extremities. It was on this occasion that the rajah offered to pay an annual tribute to the English equal to one-half of his revenue, which offer being accepted, a British force was despatched to his assistance, and the Bootaners were made to retire precipitately. The tribute having fallen into arrear, and the internal affairs of the country being greatly disorganised, an English commissioner was appointed in 1789 to collect the revenues and controul the public expenditure, retaining the amount of the tribute, and paying over the surplus to the rajah. At this time the rajah was a minor, and when he attained his majority in 1801, the commissioner was withdrawn, but the right of superintendence was still retained in the hands of the collector of Rungpore. During the residence of the commissioner, the finances of the country were rescued from the state of disorder in which they were found, the tribute was regularly paid, and a considerable surplus accrued, which was invested for the benefit of the rajah in the English funds. No sooner however had the commissioner been withdrawn, than the old irregularities were again experienced, the tribute was obtained with great difficulty, and the rajah himself was kept in a state of poverty, while his ministers by a system of extortion and embezzlement were amassing fortunes. This state of affairs continued until 1813, when the tribute being withheld, and the country generally in a state of complete anarchy, a resident English commissioner was again appointed by the governor-general, the rajah was compelled to dismiss his ministers, and appoint others on the nomination of the English government, and a system of criminal jurisprudence was established, and administered through the agency of the British commissioner. The amount of annual tribute paid to the Bengal government is between 60,000 and 70,000 rupees. (*Ayin-i-Akbari*; Rennell's *Memoir of a Map of Hindustan*; Mill's *History of British India.*)

COOK, CAPTAIN JAMES, was the son of an agricultural labourer and farm-bailiff, resident at Marton, six miles from Stockton-upon-Tees, in Yorkshire, and was born October 27, 1728. At an early age he was apprenticed to an haberdasher at the fishing town of Staiths, near Whitby. Here his genius soon showed its true bent; and having procured a discharge from his master, he apprenticed himself to a firm engaged in the coal trade at Whitby, in whose service he continued, rising gradually, till he attained the situation of mate. Being in the Thames in 1755, when men were greatly sought after, he resolved to take his chance as a volunteer in the royal navy. He was soon distinguished as a skilful and trustworthy seaman: and such effectual interest, backed by the favourable testimony of Captain, afterwards Sir Hugh Palliser, was made in his behalf at the Admiralty by some Yorkshire gentlemen, that in May, 1759, he was appointed master, first of the Grampus sloop, afterwards of the Mercury, in which he was present at the siege and capture of Quebec, by Wolfe. He gave eminent proofs of skill and resolution, in taking soundings of the river opposite to the French fortified camp, preparatory to an attack thereon, a difficult and dangerous service, which he performed so well, that he was afterwards employed to lay down a chart of the river from Quebec to the sea. This chart was published, and for a long time was the only one in use. His success in these employments is the more remarkable, as he appears never to have been taught surveying, nor even accustomed to use the pencil.

In the same autumn he was promoted to be master of the Northumberland man-of-war, in which he served till 1762, when the ship returned to England. During the winter of 1759-60, which he passed at Halifax in Nova Scotia, he employed the leisure which the season gave him in beginning the study of mathematics, with a view to qualify himself for the higher departments of his profession. In 1763 he went out to survey the Newfoundland islands; and in 1764, on the appointment of Sir Hugh Palliser to be Governor, Cook was appointed Marine Surveyor of Newfoundland and Labrador. The fruit of his labours during the four years in which he held that office, was embodied in his valuable charts of those countries.

The credit which he acquired in the discharge of his functions at Newfoundland, was the cause of his selection, in 1767, as a fit person to conduct a voyage undertaken into the South Pacific Ocean, for astronomical and geographical purposes. On this occasion Mr. Cook was promoted to the rank of lieutenant. For an account of the origin and objects of this undertaking, and the course of the voyagers as far as Otaheite, we refer to the article BANKS, SIR JOSEPH. The transit of Venus having been satisfactorily observed on the third of June, Cook resumed his voyage July 13, 1769, and after cruising for a month among the other Society Islands, sailed southwards in quest of the unknown continent, *Terra Australis Incognita*, which was formerly supposed to exist somewhere, as a counterpoise to the great mass of land in the northern hemisphere. Lofty mountains were seen October 6, and it was supposed that the object of their search was found. The land however proved to be New Zealand, which had not been visited by Europeans since it was discovered by Tasman in 1642. Cook spent six months in sailing round it, and found it to consist of two large islands, divided by a narrow channel: the warlike and savage temper of the natives hindered him from doing much to explore the interior. Sailing westward, he reached New Holland April 19, 1770, and ran down its eastern side from lat. 38° to its northern extremity at Torres Strait, lat. 10½°, where he took possession of the coast which he had explored in the name of Great Britain, and denominated it New South Wales. He then shaped his course towards New Guinea, and by passing between them proved what had been disputed, that New Holland and New Guinea were distinct islands. Of the various interesting adventures and narrow escapes which occurred to the navigators during their long sojourn among savage tribes and unknown seas, especially that difficult and tedious navigation of near 2000 miles along one of the most dangerous coasts in the world, we have no room to speak. Cook continued his voyage by Timor and the south coast of Java to Batavia (Oct. 9), where he was compelled to stay two months and a half to repair the ship, which had received most dangerous injuries among the coral reefs of New South Wales. The pestilential climate of Batavia proved very fatal to the ship's crew, already weakened by the hardships of their long voyage. Seven died at Batavia, and twenty-three more on the voyage to the Cape of Good Hope. June 12, 1771, the Endeavour anchored in the Downs.

Shortly after his return Cook was promoted to the rank of Commander. His journal and the papers of Mr. Banks were entrusted to Dr. Hawkesworth, who from these documents, and the materials of Captains Byron, Wallis, and Carteret, published an account of the several voyages of discovery undertaken during the reign of George III. into the Pacific, illustrated with plates and charts at the expense of government.

This voyage proved two things: first, that neither New Zealand nor New Holland were parts of the supposed southern continent; secondly, that no such continent could exist to the northward of 40° S. lat. It was now determined to send out a second expedition under Cook to explore the higher latitudes, and the Resolution, of 460 tons, and a smaller ship, the Adventure, Captain Furneaux—which parted company in the second year of the voyage—were commissioned for this purpose. Cook was instructed to circumnavigate the globe in high southern latitudes, prosecuting his discoveries as near the South Pole as possible, and making such traverses, from time to time, into every corner of the Pacific Ocean not before ex-

amined, as might finally and effectually resolve the much agitated question about the existence of a southern continent in any part of the southern hemisphere to which access could be had by the efforts of the boldest and most skilful navigator.

The two ships sailed from Plymouth, July 13, 1772, quitted the Cape of Good Hope Nov. 22, and traversed the Southern Ocean in high latitudes during near four months, between the limits of E. long. 20° and 170°, the extreme point to the southward being lat. 57° 15′. Having satisfied himself that no land of great extent could exist between these limits, Captain Cook made sail for New Zealand, which he reached March 26, 1773. After spending the winter months (our summer) among the Society Islands, he resumed his quest of the southern continent in November, proceeding eastward, principally between the 60th and 70th parallels of latitude, and from E. lon. 170° to W. lon. 106° 54′, where he reached his extreme southing, lat. 71°10′, where he was finally stopped by ice. Returning northwards, during the winter months he traversed the Pacific Ocean in the southern tropic, from Easter Island to the New Hebrides, and discovered another island, the largest in the Pacific except New Zealand, which he called New Caledonia. Thence he returned to New Zealand, to refresh the crew, and resumed his quest of a southern continent, November 10. Having sailed in different latitudes, between 43° and 56°, till the 27th, when he was in W. lon. 138° 56′, he gave up all hope of finding any more land in this ocean; and determined to steer direct for the western entrance of the straits of Magalhaens, with a view of coasting the south side of Tierra del Fuego, which at that time was very imperfectly known. December 29 he passed Cape Horn, and standing southward, discovered Sandwich Land, a desolate coast, the extreme point of which was named by him the Southern Thule, lat. 59° 13′, W. lon. about 22°, as being the most southern land which had been then discovered. Thence he ran to the eastward, nearly to the longitude of the Cape of Good Hope, and having thus encompassed the globe in a high latitude, and satisfied himself that no land of considerable magnitude could exist between the 50th and 70th parallels, he thought it inexpedient to prosecute his discoveries in those tempestuous seas with a worn ship and nearly exhausted provisions. Accordingly he made sail for the Cape, which he reached March 22, 1774, having sailed no less than 20,000 leagues since he left it, without meeting even with so trifling an accident as the loss of a mast or yard. July 30 he anchored at Spithead.

He was immediately raised to the rank of Post Captain, and received a more substantial reward for his services in being appointed a Captain of Greenwich Hospital. Men of science were powerfully interested, not only by his geographical discoveries, but by his unprecedented success during this voyage in preserving the health of his ship's company, of whom he lost only four, and only one of these by any sickness. His method consisted chiefly in a strict attention to diet, and to keeping the ship clean, well-aired, and dry. Much however was found to depend upon the care and influence of the commanding officer; for the crew of the Adventure, fitted out with the same provisions, had suffered considerably even at an early period of the voyage. On the day of Cook's admission to the Royal Society, March 7, 1775, a paper of his was read, giving an account of the methods. April 18, he communicated a second paper, relative to the tides in the South Seas; both of these are printed in the Philosophical Transactions, vol. lxvi. For the former the Society gave him the Copley medal, which is bestowed for the best experimental paper of the year. Of this second voyage he published his own journal, illustrated by maps and engravings; a supplementary volume containing the astronomical observations was published at the expense of the Commissioners of Longitude. The style is unpretending, clear, and manly, and, considering the imperfection of his education, does credit to his sense and ability.

While Cook was exploring the Southern Ocean, the attention of government was also turned towards discoveries in the Arctic regions. [North-West Passage.] It was not thought fair, after so many years of labour and anxiety, to request him immediately to forego his honourable ease; but when he volunteered his services, they were gladly accepted. Two ships, the Resolution and Discovery, the latter commanded by Captain Clerke, who had sailed with Cook in both his former voyages, were fitted out with every thing that could promote the health and comfort of the crews and the scientific objects of the voyage. They sailed from Plymouth July 12, 1776. Cook's instructions were to the following effect:—he was to proceed by the Cape of Good Hope to the Pacific, and to revisit the chain of islands lying along the southern tropic, in which he was to endeavour to disseminate and naturalize a variety of useful animals, to be carried from England and the Cape. He was then to bend his course northwards, and on reaching the western coast of America, to proceed with as little delay as possible to the latitude of 65°, and then to use his best endeavours to return to the Atlantic by the high northern latitudes, between Asia and America, thus reversing the usual course of Arctic voyagers. He arrived at the Friendly Islands too late in the spring of 1777 to attempt anything in the Arctic Seas that year. In December he took a final leave of the Polynesian Archipelago, and January 18, 1778, came in sight of an unknown group, to which he gave the name of Sandwich Islands, about 20° N. lat. Making no long stay, he reached the coast of America March 7, being then in 44° 33′ N. lat. In Nootka Sound, lat. 49° 33′, he stopped a month to put the ships in perfect repair before encountering the dangers of the Polar Seas, and proceeded, April 26, keeping near the coast whenever the state of the weather permitted. Following this course to the extreme northern point of the Pacific, he there examined a deep bay, afterwards named Cook's Inlet, concerning which strong hopes were entertained that it might lead to the long-sought discovery. These proving unfounded, he ran to the southward, along the narrow peninsula which forms the western boundary of the Kamtchatkan Sea; and after touching at Oonalashka, made sail for Behring's Straits. There he determined the position of the most westerly point of America, lat. 65° 40′, long. 168° 15′ W.; and ascertained it to be distant from the coast of Asia only thirteen leagues. August 18, he reached his extreme latitude, 70° 41′, where he was stopped by an impenetrable wall of ice. He continued to prosecute his search until August 29, when the daily increase of ice warned him to return. Before proceeding to the south, however, he spent some time in examining the sea and coasts in the neighbourhood of Behring's Strait, during which he had satisfactory proof of the correctness of that navigator, and made valuable additions to our geographical knowledge of that region.

Returning to winter at the Sandwich Islands, he discovered two which he had not before visited, Mowee and Owhyhee, the largest of the group. In sailing round the latter he spent ten weeks, from December 1 to February 13, 1779, without any serious disagreement with the natives, who, on the contrary, treated the English with the utmost respect. Speaking of the disappointment in not finding a northern passage, he uses the following words, which conclude his journal:—'To this disappointment we owed our having it in our power to revisit the Sandwich Islands, and to enrich our voyage with a discovery, which, though the last, seemed in many respects to be the most important that had hitherto been made by Europeans throughout the extent of the Pacific Ocean.' These pleasant anticipations were cut short by his tragical death. On the night of February 13, one of the Discovery's boats was stolen. Cook went ashore on the 14th to try to recover it; the natives became alarmed, blows were struck, and Cook was obliged to fire in self-defence. In retreating to the boats, four of the marines who attended him were killed, and Cook, who was the last person left on shore, was struck down from behind. He struggled vigorously; but the confusion of the boat's crews was such, that no assistance was given, and he was soon overpowered. His body having been left in the possession of the natives, his bones only were recovered, the flesh having probably been devoured. His remains were committed to the deep with military honours. Mr. Samwell, an eye-witness, has given the fullest account of this melancholy event, which he ascribed to no scheme of premeditated treachery, but to a sudden impulse, arising from the belief that the loss of the boat would be revenged by hostile measures. Captain Clerke succeeded to the chief command, and returned in the following summer to the Polar Sea; but he was unable to advance as far as in the former year: the voyage therefore failed in its chief object. The ships returned by China and the Cape to England, which they reached in October, 1780. An account of the voyage was published from Cook's Journal, continued by Lieutenant King. Charts and plates were

executed at the expense of government, and one-half of the profits of the work were bestowed upon Cook's widow and children, upon whom a pension was settled.

As a navigator, Cook's merits were of the first order. He was thoroughly acquainted both with the practical and scientific parts of his profession, and possessed the qualities which fit men for responsible situations—a mind inventive, and full of resources, sagacity, self-possession, and decision, and an intuitive readiness of perception in professional matters; so that his first opinion as to a course to be pursued, the nature of an opening, tides, currents, &c., was seldom found to be incorrect. His perseverance was unremitting, and needed no relaxation nor respite. He was a strict disciplinarian, but watchful and solicitous in an uncommon degree for the health and comfort of his crews; and to this constant care and to his moral influence, as much as to his judgment, we must attribute that remarkable exemption from disease which his men enjoyed, in his two last voyages, through every variety of climate. He may be said to have banished that horrible disease, scurvy, from our naval service; and it is observed by Mr. Samwell, that his success in this respect afforded him more satisfaction than the reputatoin which attended his discoveries. [ANTISCORBUTICS, p. 119.] But that which we wish to point out in his character as most rare and truly estimable, was his scrupulous justice and humanity towards the rude tribes whom he visited. For their propensity to thieving he found a candid apology; and any offences committed against their persons or property by his own crew, he strictly punished; making it a rule to pay liberally, if required, for the slightest articles, even to grass, wood, and water. Nor did he give way to the gratifying of a natural curiosity, when by doing so he was likely to provoke a hostile collision. Once only he was betrayed into an unjust aggression, which ended in bloodshed; an act which he remembered with pain, and in his journal acknowledged to be an error, while explaining the motives which led to the commission of it. The same benevolence and steady principle which he displayed in public, he carried into the private relations of life. His constitution was robust, inured to fatigue, and patient of self-denial.

(See Kippis's *Life of Cook*, which is inserted, entire we believe, in the *Biographia Britannica;* the several voyages to the Pacific Ocean; Samwell's *Narrative of the Death of Captain Cook*, which is printed in the *Biographia.*)

COOKE, BENJAMIN, a highly-distinguished composer and organist, who during the latter half of the last century supported and advanced the science of music, both by his works and precepts. He was the son of Benjamin Cooke, a music-publisher in New-Street, Covent Garden, and before he had attained his ninth year became the pupil of the celebrated Dr. Pepusch, under whom he made such progress, that when only twelve years old he was found capable of doing the duty of organist at Westminster Abbey, as deputy of Mr. Robinson, son-in-law and successor to Dr. Croft. On the death of Pepusch in 1752, Cooke was chosen as conductor of the *Academy of Antient Music*, which office he held till the year 1789, when he relinquished it to Dr. Arnold. In 1757 he succeeded Bernard Gates as lay-clerk and master of the choristers at Westminster Abbey, and in 1762 was appointed organist of that venerable church. In 1777 the University of Cambridge conferred on him the degree of Doctor in Music. In 1782, after a severe contest, in which Dr. Burney was his chief opponent, he was elected organist of St. Martin-in-the-Fields. In 1784 he was nominated by George III. as one of the sub-directors of the famous Commemoration of Handel. He died in 1793, leaving two sons—Henry, still living, who formerly held a very respectable situation in the Post Office, and Robert, who followed his father's profession, and became organist of the Abbey on the decease of Dr. Arnold; but shortly after, in a fit of insanity, threw himself into the Thames, and was drowned, to the grief of his numerous friends, by whom he was much valued, both for his talents and moral qualities.

Dr. Cooke's compositions were chiefly for the Academy of Antient Music, the Church, and the Catch Club. For the first he made the important additions, so well known to connoisseurs, to Galliard's Morning Hymn. For the second he wrote a charming service and two lovely anthems. To the highly-distinguished Catch Club, he contributed his fine glees, 'In the merry month of May,' 'How sleep the brave,' 'Hark! the lark,' 'As now the shades of eve,' &c.; and obtained seven of the gold prize medals given by that elegant and useful society. He was the intimate friend of Sir John Hawkins, the musical historian—who profited much by the occasional hints of so learned a professor—and the master of some of the deservedly celebrated musicians of the last and present age, among whom it would be an act of injustice to Dr. Cooke not to name Parsons, Greatorex, Knyvett senior, Crosdill, Spofforth, Bartleman, Beale, Walmisley, &c. (*Harmonicon*, vol. ix.)

COOKE, GEORGE FREDERICK, a popular actor, was born in the city of Westminster, April 17th, 1755. He was the son of an officer in the army, and his mother's maiden name was Renton. On the death of her husband she went to reside at Berwick upon Tweed, where George was educated. At the usual age he was articled to a printer; but having imbibed a strong passion for the stage, he appeared, after various essays in private, as a professed actor at Brentford, in the character of Dumont in the tragedy of 'Jane Shore.' In 1778 he made his debut in London, at the Haymarket theatre, for a benefit, but without attracting any particular attention. After a period of two-and-twenty years, during which he became the hero of the Dublin stage, he returned to London, and made his first appearance at Covent Garden theatre, Oct. 31, 1800, in the character of Richard III.: his success was decided: and for ten years he divided the favour of the town with Mr. John Kemble. In 1810 he sailed for America, and arrived at New York on the 16th of November, in which city, intemperance having been long undermining a wonderfully strong constitution, he expired on the 26th of September, 1812, aged 57 years and 5 months. His most popular characters were, in tragedy, Richard III., Iago, and Shylock; and in comedy, Kitely, Sir Archy Macsarcasm, and Sir Pertinax Macsycophant. Mr. Kean, in one of his visits to America, caused a monument to be erected over his grave. His memoirs were published by his friend Mr. Dunlop from a MS. journal kept by Mr. Cooke for many years, and other equally authentic documents, in 2 vols., 8vo., London, 1813.

COOLER. Various contrivances have been adopted by brewers and distillers for cooling their worts. This has been done by exposing the hot liquor in shallow wooden vessels to the air, and by the use of stirrers or fans to keep the liquor in motion, and thus expose fresh surfaces to the air.

The plan has also been adopted of passing spring-water, which in deep wells is usually about 52° even in summer time, through metal pipes placed in the liquor to be cooled.

Wine-coolers are made of porous earthenware, which being soaked in and saturated with water, by its gradual and copious evaporation occasions cold; and in Spain water-coolers, called alcarrazas, are made on the same principle. Coolers of this kind, made of porous clay, lightly baked, and rather thin, are also common in Egypt, where they are often represented on the antient monuments in a form very much resembling both those now used in Egypt, and such as we see in use at Cadiz and other places in the South of Spain. On the monuments of Egypt we sometimes observe a man fanning these earthen vessels with a palm-leaf, in order to promote the evaporation. The Arabs of Egypt are well acquainted with the practice of fanning their earthen vessels to quicken the evaporation. M. Costaz, when in Egypt, made the following experiment on the refrigerating power of these earthen vessels. The thermometer in the shade, but exposed to the air, marked 110°.75 Fahrenheit during the greater part of the day. At sunset the Nile water was 82°.6; an earthen vessel filled with this water was placed on the deck of the boat in which M. Costaz passed the night on the Nile. At day-break the temperature of the river was the same, but that of the water in the jar was only 61°.25, and more than half of the water was evaporated.

COOPER. [SHAFTESBURY, EARL OF.]

COORDINATES mean lines, angles, &c. ranged in order. The notion from which the word arose was this, that when the positions of consecutive points on a curve are referred to given points or lines by means of lines (as in ABSCISSA) or angles, those lines or angles present a succession of *arranged* data, by which the several points of the curve may be treated *in order*. It was Descartes who first used coordinates in the second book of his geometry, and the words in which this now all-pervading method of expression was announced are as follows: 'Eligo rectam aliquam lineam, veluti AB, ut ad diversa ejus puncta referam omnia puncta hujus curvæ lineæ CE; deinde eligo

etiam punctum aliquod in AB, veluti A, ad *ordiendum* ab eo calculum.' We do not find the word in Schooten, Beaune, or others of the immediate school of Des Cartes. De Witt calls the abscissa *crus patiens*, and the ordinate *crus efficiens*. Coordinates (so called) are used in the writings of John Bernoulli, but in Newton the phrase for them is 'lineæ ordinatim applicatæ:' in later times the use of the word has become universal. Coordinates either determine the position of a point in space, or in a plane which is understood to contain all the figure under consideration, as in the first six books of Euclid. They determine position either by straight lines only, or by a straight line and angles: in the latter case they are called *polar* coordinates.

1. Rectilinear coordinates in a plane. In the given plane draw two straight lines meeting in a point O (called the *origin*). From any point P draw parallels to the two lines just named: the parts intercepted between P and these lines (called *axes*) are the coordinates of the point. When the axes are at right angles, the coordinates are said to be *rectangular;* when at any other angle, *oblique*. [ABSCISSA.]

2. Rectilinear coordinates in space. Through any point O (the origin) draw three planes which intersect in right lines (the axes). Through any point P draw parallels to the axes: the parts intercepted between P and the coordinate planes (three in number) are the coordinates of P.

3. Polar coordinates in a plane. Choose any point O in the plane, and any right line O A passing through O. Then taking any point P, the distance O P (called the *radius vector*) and the angle P O A (which has no distinct name, but might be called the *vectorial* angle) are the polar coordinates of P.

4. Polar coordinates in space. Choose a plane (M), a point O, and a line O A, in the plane M. Take any point P above or below the plane, and let fall P B, a perpendicular on (M) meeting (M) in B. Then the radius vector O P, and the angles P O B and B O A are the polar coordinates of P. In astronomy, if O be the earth's centre, O A the line passing through the equinox, and (M) the plane of the ecliptic; then B O A is the longitude of P, and P O B its latitude. But if (M) be the plane of the equator, then B O A is the right ascension of P, and P O B its declination.

COORG, or CADUGA, a small principality which occupies the eastern part of the mountain range called the Western Ghauts, and extends from the Tamberacherry pass, on the south, in 11° 25′ N. lat. and 76° 20′ E. long., to the river Hennavutty, on the confines of Bedune, on the north, in 12° 42′ N. lat. The greatest length is about 70 miles, and the mean breadth about 22 miles. On the north it is bounded by Canara and Mysore, on the west and south by the province of Malabar, and on the east by Mysore. The country presents a succession of hills and valleys, placed at a medium elevation between the sultry plains and the tempestuous tops of the mountains; it enjoys a temperate climate, and has a fertile soil: in many parts it is well cultivated, but in others is overrun with jungle, which is the resort of wild elephants and many beasts of prey: some considerable forests also occur, and from these a good deal of sandal-wood is obtained. The Tungha and Bhadra, which after their junction are called the Toombuddra and the Cavery, have their sources in the Coorg country, which is so well watered and subject to so much rain, that rice is produced in sufficient abundance, not only for the inhabitants, whose principal food it forms, but also for exportation to Mysore: a considerable quantity of cardamom seeds are raised and exported. There is besides abundance of excellent pasturage, and great numbers of cattle are reared. The manufactures of the country are confined to a coarse kind of blanket, which forms part of the dress of the common people: the cotton cloths which they use are all imported. Periapatam, in 12° 22′ N. lat. and 76° 11′ E. long., was formerly the capital of the principality, but its proximity to the Mysore territory, the distance from Seringapatam being only 37 miles, occasioned it to be abandoned in favour of Mercara, which is now the residence of the rajah and the seat of his government. This town stands surrounded by an amphitheatre of hills, in 12° 26′ N. lat. and 75° 30′ E. long. The fort is a pentagon, with towers and bastions; within this is the rajah's palace, which is handsomely furnished in the European style.

The rajah of Coorg is mentioned by Ferishta as an independent prince in 1583. Many vain attempts were made by the Mysore rajah to subgugate the country, but a dispute about the succession having arisen between two brothers, Hyder Ali offered his mediation, and this being accepted, he by treacherous means obtained possession of the territory. One of the brothers he destroyed, together with his family, and the other he kept prisoner in the fort of Cuddoor, on the eastern frontier of Bednore. This rajah dying in 1779, Hyder put aside his son, whom he confined in Periapatam, and parcelled out the country into jaghires among several petty Mohammedan chiefs. After a confinement of eight years, the young rajah, Beer Rajindra, was released from his confinement by twelve of his subjects, chiefs of villages, who for that purpose repaired in disguise to the place of his confinement. His standard was immediately joined by all ranks of his people, and the invaders were with some difficulty driven out. This prince, Beer Rajindra, was a man of enlarged mind and noble disposition, and during his reign he succeeded in preserving order within his dominions, and in conciliating the affection of his subjects. At his death, in 1808, he left the succession to an infant daughter, to the exclusion of his brother, to whom of right it belonged according to antient usages; but the young ranny or princess having abdicated in favour of her uncle, with the sanction of the British government and to the satisfaction of the Coorg people, the country has since remained tranquil and prosperous. (Mill's *History of British India;* Buchanan's *Journey through Mysore, Canara, and Malabar;* Heyne's *Statistical Tracts on India.*)

COPAIBA or COPAIVA, an oleo-resin or turpentine (incorrectly termed a balsam, since it is destitute of benzoic acid), is procured not merely from the Copaifera officinalis (Willd.), a native of Venezuela, also naturalized in the Antilles, but from ten or twelve species, chiefly natives of Brazil. It varies in appearance and qualities according to the species from which it has been procured, and likewise according to the age of the tree and the time of the year. Incisions are made in the tree, from which flows a liquid differing little in consistence from thick sap. It is collected in calabashes, after which the incisions are closed with wax or clay. The incisions are repeated in general three times each season. The fluid is brighter or darker in colour, more or less rich in volatile oil, more acrid or more bitter, according to circumstances. It is mostly of a light yellow colour, clear and transparent, seldom turbid or cloudy; odour peculiar, volatile: taste oily, mild, slightly aromatic, at last acridly bitter. Specific gravity 0.966 to 0.997, according to its age. Exposed to heat in a platinum spoon, it is entirely consumed with a white smoke. In a state of purity, it consists of a volatile oil, in the proportion of 40 to 45 per cent., and 50 per cent. of an acid crystallizable resin. The oil may be separated by distillation, or by means of mixing equal parts of copaiba with alcohol of specific gravity 0.837, shaking them diligently, then mixing 100 parts of the copaiva which has been so treated with 37¼ parts of a ley of caustic soda, to be again well shaken; after which 150 parts of water are to be thoroughly agitated with it, and the whole left to rest. The specific gravity of the oil thus obtained is 0.900. A slight difference exists between the oil thus procured and that by distillation. Both are used in medicine; indeed the oil is the active principle of copaiva, the resin being of very secondary importance. The oil is destitute of oxygen, and may be employed for the preservation of potassium.

Copaiva is frequently adulterated: the presence of any extraneous matters may be known by the manner in which the suspected portion conducts itself towards solvents and re-agents. Copaiva is occasionally mixed with castor-oil, almond, poppy, nut-oil, and the finer sorts of turpentines. All fixed oils (except castor-oil, the presence of which may be detected by sulphuric acid, but the accuracy of this test is called in question by Brandes) separate from it by being allowed to remain at rest. Good copaiva should be perfectly soluble in alcohol of the strength of 90 per cent. It is soluble in all known æthers, and in the volatile and fixed oils. Three parts of copaiva with one of caustic ammonia of specific gravity 0.950 form by agitation a clear soap. The simplest test of the purity of copaiva is to heat a small quantity in a watch-glass, when, if good, a hard brittle resin remains, which has considerable analogy with styracin. The crystals which form in this resin are six-sided prisms, and have the property of polarizing light.

A kind of copaiva is obtained in St. Domingo from the

Croton origanifolius (Lamarck); in Java and elsewhere the juice of the Canarium commune (Linn.) is found to possess similar properties.

Copaiva acts as a stimulant to the mucous surfaces, especially of the rectum and urino-genital passages: when the dose is small, it influences the kidneys and urethra; but if large, the rectum. It is chiefly used to lessen increased discharges from those organs, and if judiciously employed, generally effects this object; but if given prematurely or in too large a dose, it seldom fails to aggravate the complaints and occasion other serious symptoms. It has likewise been beneficially given in affections of the mucous membrane of the lungs, such as chronic bronchitis, which must be carefully distinguished from true phthisis pulmonalis or consumption, a disease in which it cannot fail to prove injurious.

Various means have been devised to conceal the disagreeable nauseous taste of copaiva without impairing its qualities. Calcined magnesia thickens it, and permits it being made into pills; an æthereal or alkaline solution will also retain the virtues, and lessen the repulsive taste.

COPAI'FERA OFFICINA'LIS, the plant from which balsam of copaiva is procured, is a tall handsome tree, with a fine head, found wild in the Spanish Main, and occasionally seen in Martinique, where it has been introduced. The leaves are pinnated, alternate, with lanceolate-ovate leaflets of a somewhat leathery texture and a shining surface, perfectly entire, and two or three inches long. The flowers grow in axillary panicles, densely collected towards the ends of the branchlets, white, and about eight in a cluster.

The tree, according to Jacquin, is common about the town of Tolu, thirty leagues from Carthagena, growing promiscuously with the species that yield balsam of Tolu, balsam of Peru, and similar secretions.



COPAL, a resin possessed of peculiar properties, the produce of the Rhus copallinum, a native of Mexico; it is in rounded masses, smooth and brittle, transparent or nearly so, without colour, or having a slight tinge of yellow: it has but little taste, and is nearly inodorous; it is insoluble in water, fusible, and inflammable. It differs from most other resins in its very sparing solubility in alcohol; and of the little that dissolves with the assistance of heat the greater part is deposited as the solution cools. It is dissolved by æther and some essential oils.

COPAL VARNISH, is the substance for preparing which this resin is most employed. It is probable that every manufacturer has his peculiar mode of proceeding: Tingry prepares the simple copal varnish by heating eight ounces of oil of turpentine in a matrass with the heat of a salt-water bath; as soon as this reaches its boiling point, he gradually throws in an ounce and a half of copal reduced to powder, keeping the vessel in a state of circular motion. This author further states that to obtain this varnish colourless, the rectified oil is to be exposed previously to the sun for some months in bottles, leaving an interval of some inches between the cork and the surface of the liquid; by this the oil undergoes some change, which renders it a better solvent of copal.

The varnish thus prepared is stated to be exceedingly durable and brilliant; it resists scratches, and is susceptible of a fine polish. Tingry particularly recommends it to be applied to philosophical instruments. There are several modifications of this varnish used for particular purposes, as with the addition of oil of lavender and oil of lavender and camphor, an account of which may be seen in the author above named.

COPENHAGEN, or KIOEBENHAVN, one of the six royal districts into which the Danish province of Seeland is divided, comprises the centre of the eastern portion of the island of Seeland and the islands of Amager (Amak) and Saltholm. It is bounded on the north, south, and west by other districts of Seeland, and on the east by the Sound and the Baltic. It contains an area of about 525 square miles, which are divided into three probsteien or provostships, each of which contains two harden or circles. Exclusive of the capital, the population is about 40,000; inclusive of it, the numbers are about 156,000; it has 78 parishes, 4 towns, besides the capital, and 197 villages. This circle is on the whole very fertile.

COPENHAGEN, the metropolis of the kingdom of Denmark, is situated partly on the eastern coast of the island of Seeland, and at the southern extremity of a gulf in that narrow channel of the Baltic called the Sound, which is here about 14 miles broad, and partly on the northern coast of the small island of Amager or Amak. It lies in 55° 42′ N. lat., and 12° 34′ E. long., is about 5 miles in circumference, 1¾ in length, and 1¼ in breadth; and is divided into three principal districts—the Old Town or Aldstadt, the New Town or Friedrickstadt, and Christianshavn. These three quarters are surrounded by ramparts and ditches, and defended by 24 bastions, besides outworks, and towards the sea by a very strong citadel. Without these lines are the three suburbs of the North Bridge, East Bridge, and West Bridge. Altogether Copenhagen is one of the finest capitals in Europe. It is divided into 12 quarters, and contains 10 public squares, 5 market-places, 3 royal palaces, 9 parochial churches, a Roman Catholic chapel, 5 synagogues, 3 religious foundations, 13 hospitals, a foundling asylum, and 30 poorhouses. Its aspect, on emerging from the narrow entrance into the port, which is capable of containing 500 merchant vessels, besides the whole navy, is very grand and striking.

The Old Town, or what is called the City, is the most southern quarter. It is separated from the New Town by a canal and the 'Gothic Street,' and united to Christianshavn by a bridge; it is large and populous, has a fine appearance, and contains the spacious area called the New Market, which is embellished by the palace of Charlottenburg. Here also is the royal palace of Christianberg, built by Christian between 1732 and 1740. It was burnt down in 1795, but is now nearly restored, and is one of the finest buildings in Europe. It contains a magnificent palace-church, the royal galleries of paintings, natural history, &c., in a series of twelve saloons; the library, in which are 400,000 volumes, a valuable collection of engravings, and the marble sculptures and casts of Thorwaldsen. The other remarkable buildings in this quarter are Prince Frederick's palace; the palace of Charlottenburg, above mentioned, and now occupied by the Academy of Arts, a picture gallery, and a repository for the artillery, &c.; the bank, exchange, new town-hall, and Trinity church, on the top of whose singularly constructed round tower, which is 115 feet high, an observatory is erected; and the university with four colleges, which was founded in 1478 by Christian I. This university is attended on an average by 700 students, and has a library of 60,000 volumes, a collection of MSS. relative to northern and Icelandic history, a museum of northern antiquities, a botanical garden, a cabinet of natural history, a theatre of anatomy, &c.

The New Town, which is the most northern quarter of the city, and of which Frederickstadt is the finest portion, is laid out in broad streets, and contains the handsomest buildings in Copenhagen. Here is the antient royal palace of Rosenberg, in which are deposited the crown jewels, a beautiful collection of antiquities, and a cabinet of coins and medals; its ample gardens form a public promenade. Frederick's place, a noble octagonal space, is chiefly formed

by the Amalienborg, a structure composed of four large palaces—those of the king, the prince royal, the king's brother, and the naval school; one of the sides is open, and is embellished with a beautiful equestrian statue of Frederick V.

The third division of Copenhagen is Christianshavn, situated on the island of Amager, and united to the town by two bridges thrown across the narrow arm of the sea which separates Amager from Seeland; it forms an admirable harbour, which is the great naval station of Denmark, and is capable of containing above 500 ships. In this quarter, which presents regular well-built streets and handsome squares, is St. Saviour's church, the finest in Copenhagen, with its singular tower, 288 feet in height: the beautiful Frederick's church; and the warehouses of the Danish East India Company. In this direction are situated the two smaller islands of Old and New Holm, which contain the stores, dockyard, slips, and arsenals of the fleet, &c.

Copenhagen is the seat of a bishopric. It contains altogether 29 Protestant churches, a Roman Catholic chapel, 3 synagogues, 22 hospitals, (one of which accommodates above 2000 patients,) a naval hospital for 1000, and other benevolent institutions for human infirmities. The city possesses also a museum for northern antiquities, the Claasen library for mathematics, natural history, &c., containing above 34,000 volumes; a royal museum of the arts, cabinets of coins, mechanical objects, &c.; a naval and military cadet academy, 114 schools of various descriptions, a mechanics' institute, conservatory of music, &c. The principal learned societies are the Royal Academy, the Society for promoting Northern History and Languages, a Society of National Economy, Societies for Icelandic Literature and for Northern Antiquities, a Bible Society, &c.

The population in 1797 amounted to 85,161; in 1829 to 111,997, of whom 54,950 were males and 57,047 females; and at present it is about 116,000, including 2600 Jews. The chief source of employment is commerce and navigation, which is greatly promoted by the East India Company and various commercial associations. Though Denmark is rather an agricultural than a manufacturing country, there are a great number of manufactories in Copenhagen, which afford occupation to above 3000 persons; among them are 242 brandy distilleries, 50 breweries, 5 vinegar distilleries, 9 sugar refineries, 8 soap-boilers' works, 32 manufactories of tobacco, 21 of cloth, 23 of cotton goods, 18 of hats, 24 of gloves, 29 of linen and cordage, 3 of silk, 29 tanneries, 5 iron-founderies, &c. General trade has much declined, principally in consequence of Altona being a free port, which Copenhagen is not. The East and West India trades are however still pursued to much advantage.

Copenhagen is said to have been founded by Bishop Axel in 1168, when it was only a poor hamlet of fishermen; but as a town Copenhagen dates only from the thirteenth century, and as a city since 1443 only, when, having been much enlarged, it received municipal privileges, and became the royal residence. On the 27th of May, 1660, the peace of Copenhagen was concluded in the camp of Copenhagen, after the Swedes had in vain endeavoured to reduce it by a siege: on the 2nd of April, 1801, Lord Nelson gained here a great naval victory over the Danish fleet. It has frequently suffered much from conflagrations as well as from hostile bombardments, especially during that by Lord Cathcart, in 1807, when 308 houses were totally burnt, 2000 considerably injured, and 1106 inhabitants killed; but it has nearly recovered from these disasters.

The climate is damp and unhealthy; the water is of a bad quality; and the mortality is said to be greater than in any other town in Denmark. In the neighbourhood of Copenhagen are the king's summer palace of Fredericksberg, a splendid structure with delightful gardens, in the church attached to which the kings of Denmark are anointed: another royal palace, a fine specimen of the architecture of the middle ages, is at Roeskilde, a small town where the royal remains, particularly of the Oldenburg line, are deposited; and at Jaeger Preis is another royal residence, where many great men of the north are interred —among others, Bernstorf, the celebrated Danish statesman, and Tycho Brahé.

COPE'RNICUS, NICOLA'US. The real name was Copernik, or, according to others, Zepernic. We shall not discuss either this, or the somewhat more important question, whether he was born, as Junctinus asserts, at 38 minutes past four on the 19th of January, 1472, or, as Mæstlinus asserts, at 48 minutes past four in the afternoon, February 19, 1473. Morin adopts the date of the latter, but remarks that the horoscope was a most happy one for talent, as appears by the nativity given by the former.

The principal authorities for the life of Copernicus are the account of Gassendi, published with the life of Tycho Brahé [BRAHE', TYCHO]; the *Narratio*, &c. of RHETICUS, and an account prefixed to his Ephemeris for 1551. The latter two we have not seen, but Gassendi cites abundantly from them. Weidler also mentions Adamus, *Vit. Phil. Germ.* There is nearly a literal translation of a large part of Gassendi's life in Martin's *Biographia Philosophica*; a sufficient abstract in Weidler, and a full account of the writings of Copernicus in Delambre's *Hist. de l'Art Mod.*, vol. i.

Copernicus was born at Thorn, in Prussia, a town on the Vistula, near the place where it crosses the Polish frontier. His family was not noble; but his uncle, Lucas Watzelrode, was bishop of Warmia (episcopus Warmiensis), whence it is frequently stated that Copernicus afterwards settled at a town of that name; whereas the cathedral was situated at Frauenburg, a town on the coast, near the mouth of the Vistula, and, as to social position, about 50 miles both from Königsberg and Danzig. Copernicus was educated first at home, and then at the university of Cracow, where he became doctor of medicine. He paid more than usual attention to mathematics, and afterwards to perspective and painting. A portrait of himself, painted by himself, passed into the possession of Tycho Brahé, (see his *Epistles*, p. 240,) who wrote an epigram on it, the point of which appears to be (the portrait being a half-length) that the whole earth would not contain the whole of the man who whirled the earth itself in ether. After the completion of his studies at Cracow, Copernicus went to Italy, and stayed some time at Bologna, under the instruction of Dominico Maria. His turn for unusual speculation began to appear in his having at this time the notion that the altitude of the pole was not always the same at the same place. He was certainly at Bologna in 1497, and by the year 1500 he had settled himself at Rome, as appears by astronomical observations which he is recorded as having made. At Rome he gave public instructions, and [in some official capacity (magno applausu factus mathematum professor): he is said, while thus engaged, to have established a reputation hardly less than that of Regiomontanus. In a few years, but the date is not precisely stated, he returned to his native country, where (having taken orders, we suppose, in Italy) his uncle gave him a canonry in his diocesan church of Frauenburg. There, after some contests in defence of his rights, not very intelligibly described, he passed the rest of his days in a three-fold occupation—his ecclesiastical duties, his gratuitous medical practice among the poor, and astronomical researches. He went very little into the world; he considered all conversation as fruitless, except that of a serious and learned cast; so that he formed no intimacies except with grave and learned men, among whom are particularly recorded Gysius, bishop of Culm, and his pupil and follower, the celebrated Rheticus. A large mass of his epistles is said by Gassendi to have fallen into the hands of Broscius, professor at Cracow, but none have been published. He was all this time engaged as well in actual observation as in speculation. His instrumental means, however, were not superior to those of Ptolemy; and he perfectly well knew the necessity of improvement in this department. 'If' (said he to Rheticus, whose Latin has certainly been misprinted, but in a manner which leaves the meaning sufficiently clear,) 'I could determine the true places of the heavenly bodies within ten seconds of a degree, I should not glory less in this than in the rule which Pythagoras has left us.'

Copernicus was struck by the complexity of the Ptolemaic system, and searched all antient authors to find one of a more simple character. The earth stationary in the centre of the universe, the planets moving round it carried on enormous crystalline spheres, (for though many might use this as mere hypothesis, the refutation of Tycho Brahé from the nature of the orbits of comets shows that he considered the *material* spheres as one of the opinions of his day,) and finally the enormous sphere of the fixed stars, carried round once in every 24 hours, struck him with a feeling that such a system could not be that of nature.

He found in Martianus Capella and others proofs that an opinion had formerly prevailed to some extent that Mercury and Venus, at least, moved round the sun; that the Pythagoreans held the rotation of the earth; and that Philolaus had even imagined the earth to have an orbit round the sun. It is very doubtful to what point these several opinions were carried, or on what grounds they were supported: it is sufficient for our purpose here that Copernicus found such doctrines attributed to the sects and persons above mentioned, and took them into consideration, with a view to see how far phenomena could be made to follow from them with more simplicity than in the system of Ptolemy. At what time he finally adopted his own system is not very clear; his work was completely written in 1530, and from that time he did nothing except to add and alter. And since Copernicus says, in his epistle to Paul III., that he had been very long pressed by his friends to publish, the above date is not improbable. In the mean while his opinion was circulated even among the vulgar; and he was satirized on the stage at Elburg. His reasons had convinced Reinhold, Rheticus, Gysius, and others; and upon the representations made to him, Cardinal Schonberg was desirous of having the work printed, and wrote to Copernicus to that effect from Rome in 1536. But though backed by a cardinal, a bishop, and two of the most learned astronomers of the age, Copernicus was well aware of the odium which an attempt to disturb established opinions would excite; and it was not, it seems, till about 1541, that a tardy consent was extorted from him. The work was accordingly delivered to Gysius, and by him to Rheticus, who, thinking that it would be best printed at Nuremberg, entrusted it to Andrew Osiander, who superintended the printing, and wrote the remarkable preface, which is always attributed, and even by Delambre, to Copernicus himself. This is explicitly stated by Gassendi, and the reason assigned is the obvious one that Osiander (besides thinking it necessary to print the cardinal's request) was afraid of shocking public opinion, and thought it best to represent the scope of the work, not as actually affirming the motion of the earth, but as using such an hypothesis for the more simple and ready calculation of the heavenly motions.

He says, 'It is not necessary that hypotheses should be true or even probable: it is sufficient that they lead to results of calculation which agree with observations.' He points out the admitted defects, and admitted unlikelihood, of several points of the Ptolemaic system; requires that the new hypothesis should be admitted on the same footing as the antient ones, and ends thus—'Neither let any one, so far as hypotheses are concerned, expect anything certain from astronomy, since that science can afford nothing of the kind; lest, in case he should adopt for truth things feigned for another purpose, he should leave this study more foolish than he came.'

With such safeguards, headed by the urgent request of a cardinal, and dedicated, probably by permission, to the pope, the work was ushered into the world, of which it was the ultimate destiny to help largely in overthrowing submission to authority in matters of science, whether to the doctrines of the Greeks or to the reputed interpretation of the sacred writings. The title-page is as follows:—

NICOLAI CO-

PERNICI TORINENSIS

DE REVOLVTIONIBVS ORBI-

um cœlestium libri vi.

Habes in hoc opere iam recens nato & ædito, studiose lector, Motus stellarum, tam fixarum quàm erraticarum, cum ex ueteribus tum etiam ex recentibus obseruationibus restitutos: & nouis insuper ac admirabilibus hypothesibus ornatos. Habes etiam tabulas expeditissimas, ex quibus eosdem ad quoduis tempus quàm facilli me calculare poteris. Igitur eme, lege, fruere.

Ἀγεωμέτρητος ὀδεὶς ἐισίτω

Norimbergæ apud Ioh. Petreium.

Anno M. D. XLIII.

The taste of what we should now call the puff in the title-page is doubtless that of Osiander, to whom it is due that the great work of Copernicus contains an expression of recommendation to *buy* it in the title-page, being the only instance of the kind we know. The second edition, edited by Rheticus, was published at Basle, 1566, and is little esteemed; the third, edited by Muler, was printed at Amsterdam in 1617, and again in 1640, with notes: it is the most correct of the three. This same Muler, in his Tabulæ Frisicæ, Alcmaar, 1611, has reduced the hypotheses of Copernicus to the form of tables.

We now come to the description of the *Copernican* system, by which we mean, the system actually promulgated by Copernicus, and not the Keplerian, Galilean, Newtonian, Halleian, Laplacian, &c., system which bears the name. We have before remarked [BRAHE', TYCHO], that it is customary to call all existing notions on the system of the world, Copernican. This matters little, considered as a mere method of expression; but it becomes of consequence when, by means of it, a degree of lustre is thrown on the speculations of Copernicus, which, properly considered, they do not need, and, critically examined, they will not bear. We are accustomed to see Copernicus represented as a man so far in advance of his age, that in the main points of his system nothing has been added and nothing subtracted. The plates in our elementary works show, under the heading of 'the Copernican system,' planets, satellites, and comets, all with orbits such as the latest discoveries have assigned. We shall therefore exhibit the 'Copernican system' as far as we can in the words of its author (translated, of course), and at greater length than would have been necessary had no misconception prevailed. It will hardly be supposed that we intend an absolute depreciation of the merits of one of the most original talents that ever existed. Copernicus was a mathematician of the first order, a sincere lover of truth, a mind free from trammels to an extent which was then almost unknown, and which we should have deemed almost incredible had we not had the proof before us. It is no easy thing for us to conceive the state of a head furnished in youth with theories upon all things in heaven or earth, proved in as many words by the assertion that Aristotle said it.

The work 'De Revolutionibus,' &c., consists of an introductory dedication to Paul III., and six books. In the former Copernicus distinctly informs us that, being discontented with the complexity of the prevailing systems, he closely examined all the writings of the ancients, to see if he could find anything better. He found the testimony of Cicero and Plutarch, as to the opinions of Nicetas, Pythagoras, and Philolaus. He thereupon claims for himself the same licence, adverts to his hypothesis as purely fictitious, and says, 'Quamvis absurda opinio videbatur, tamen quia sciebam aliis ante me concessam libertatem, ut quoslibet fingerent circulos ad demonstrandum phenomena astrorum. Existimavi mihi quoque facile permitti, ut experirem, an posito terræ aliquo motu firmiores demonstrationes quàm illorum essent, inveniri in revolutione orbium cœlestium possent.' With regard to the word demonstration, it must be particularly remembered that at this period the term, as applied to astronomy, always meant a showing how the thing would happen if the supposition were true, not a proof of the supposition itself. Thus, in this sense, the supposition of a daily motion of the sun round the earth may be made to yield a perfect *demonstration* of the phenomena of day and night; and it would be legitimate to say that of two hypotheses, one false and one true, the false one might give *truer demonstrations* of the celestial motions than the other.

The first book contains the propositions—1. That the universe is spherical; which is proved by old reasons, such as that a sphere is the most perfect figure, &c. 2. That the earth is spherical; for which he gives the same reasons as are now given. 3. That the earth and sea make one globe. 4. That the motions of all the heavenly bodies must be either uniform and circular, or compounded of uniform and circular motions. Nothing but circular motion, he asserts, could reproduce phenomena periodically; and he maintains that a *simple* body must move circularly. 5. He examines the questions whether the earth can have an axical and an orbital motion, and satisfactorily shows that, supposing the distance of the fixed stars to be immense, there is no astronomical reason to the contrary. 6. He gives what he imagines to be a proof that the sphere of the

fixed stars is immensely distant. It must be observed that he has no notion of a universe of stars unequally distributed throughout space. 7 and 8. He examines and argues against the reasons of the antients for placing the earth in the centre of the universe, by considerations which are as purely imaginary as those against which he was contending. He says that circular motion must be that of a whole, rectilinear motion that of a part separated from its whole; and from this assumption he deduces the falling of a body to the earth. That rectilinear and circular motion can exist together is, according to him, a thing of the same kind as the notion of a horse existing with that of an animal. He is throughout possessed by the opinion that there must be a *centrum mundi*, or fixed point in the middle of the universe, which, however, he considers to be the sun, not the earth. It is needless to say that the centrum mundi forms no part of the Newtonian system. 9. He contends for the possibility of the earth having several motions. 10. He establishes the order of the planets, remarks that it is impossible to explain the motion of Mercury and Venus upon the supposition of the earth being their centre, and observes that the motion of the other planets round the sun is perfectly possible, consistently with that of the earth, if the radii of their orbits be made large enough. He draws a diagram of the system in the manner now usual, and concludes with the following words, which must be considered as the first announcement of the system:—'Proinde non pudet nos fateri hoc totum, quod luna præcingit, ac centrum terræ per orbem illum magnum inter cæteras errantes stellas annuâ revolutione circa solem transire, et circa ipsum esse centrum mundi: quo etiam sole immobili permanente, quicquid de motu solis apparet, hoc potiùs in mobilitate terræ verificari, &c.' It must be observed that he lays down a sphere for the fixed stars so distinctly, that his commentator Muler finds it necessary to remind the reader that he does not *name* the spheres of the planets. But we shall presently see that he could not divest himself of the idea that the primitive motions of the planets were such as would be caused by their being fixed in immense crystal spheres which revolve round the sun.

Before proceeding further it will help us here to observe, that Copernicus does not in the smallest degree attempt to answer the mechanical objections to the earth's motion, which were urged with success against his system till the time of Galileo. The laws of motion, as then explained, and as admitted by Copernicus himself, were altogether insufficient to explain why, if the earth moved, a stone should fall directly under the point from which it is dropped. No explanation of such difficulties is given by Copernicus, nor can we find (nor did Delambre find) that they are even alluded to as an element of the question. If the mechanics of Copernicus had been true, the system of Copernicus would have been physically impossible. Now this is an essential element in the character of a discovery, which is materially altered if that which is advanced as true be advanced on false grounds. It is true that fire burns, and it is true that two and two make four; but it is false that two and two make four *because* fire burns. We give no credit to the Pythagoreans, if it be true, as asserted, that they placed the sun in the centre of the planets because they thought fire the most excellent of all things. We may consider the omission of Copernicus in two different lights. The first is, that he saw the mechanical difficulties, but was so struck by the simplicity of his astronomical system that he thought it more probable than the mechanics of his day, and suspected that future researches would produce laws of motion which should allow of the possibility of his system; and thinking thus, he judged it more wise not to enter upon the mechanical question, so as thereby to shock two sets of received opinions at once. This would do honour to his sagacity; but unfortunately, the single sentence above alluded to, the equestrian simile, prevents us from supposing that if he considered the subject mechanically at all, he was other than satisfied with his own conclusion, 'Cum ergo motus circularis sit universorum, partium vero etiam rectus, dicere possumus manere cum recto circularem, sicut cum *ægro* animal.' The word in italics must be a misprint for *equo*, as remarked by Muler. The latter distinctly points out that this is meant to explain the difficulty of a falling stone, and adds, 'Sententiæ hujus veritas dependet ex hypothesi Copernicianа;' that is, the truth of the proof depends upon that of the thing proved. He should have said (and possibly did mean), that upon the truth of this sentence the Copernican hypothesis depends, so far as it was proved by Copernicus himself. Our readers now must begin to have an idea how great an injustice has been done to those who found better reasons for the coexistence of rectilinear and circular motion, by the attachment of the name of Copernicus to the present cosmical system.

The second method by which we may suppose Copernicus to have reconciled difficulties, is the actual assertion made both by himself and Osiander, that the hypothesis of terrestrial motion was nothing *but* an hypothesis, valuable only so far as it explained phenomena, and not considered with reference to absolute truth or falsehood. It is usual to consider the expressions in question entirely as a concession to general opinion, and as intended either to avoid the Inquisition, or to induce those to look into the book who would otherwise have put it aside as anti-Mosaical and heretical. And though there may be some truth in this, we are on the whole inclined to suspect that the hypothetical hypothesis, as we may term it, really did bias the mind of Copernicus much more than has been supposed. We do not at all concede that the interference of ecclesiastical power was as likely in the case of the Prussian priest of 1540, as in that of the Italian layman of 1633. Nothing is more common that to view the middle ages as a whole, without noticing the ebbs and floods of power and opinion. The epoch contained between the last Lateran Council and that of Trent, in which the work of Copernicus was written, printed, and published, was sufficiently occupied by diocesan councils, both against Luther, and on the reformations in discipline of which the necessity began to be perceived. It appears to us far the most likely that the mind of Copernicus must have balanced between the two views we have described, and probably must have inclined different ways at different times.

We now come to the brightest jewel in the crown of Copernicus, the method in which he explained, for the first time and with brilliant success, (so far as *demonstration* went, as before described,) the variation of the seasons, the precession of the equinoxes (book i. cap. 2, book iii., and book vi. cap. 35), and the stations and retrogradations of the planets. The latter point is fully made out, and in the manner now adopted, so far as the *qualities* of the phenomena are concerned: we shall presently see the method of rectifying the *quantities*. With regard to the variation of the seasons, Copernicus explains it rightly, from the continual parallelism of the earth's axis. But he cannot obtain this parallelism from his mechanics. He imagines that if the globe of the earth move round the sun, and also round its own axis, the axis of rotation must always preserve the same inclination to the line joining the centre of the earth and sun: just as when a ball fastened by a string is made to spin, and a conical motion is simultaneously given to the string and ball. It is most evident that he got this idea from the solid crystal spheres. If the earth's axis were fixed in an immense sphere, with which it turned round the sun, and if in the first instance the axis produced would pass through the axis of the sphere, the complete phenomenon of Copernicus would be produced. The earth's axis would then describe a cone yearly. To produce parallelism, Copernicus imagines what we may call an anticonical motion, namely, that the earth's axis is itself endued with such motion, independent of its motion in the sphere, as would, did it act alone, carry the axis round the same cone in a year, but the contrary way. The effect of the two motions is to destroy each other, and the axis remains parallel in all its positions. Then, by supposing the anticonical motion to be a little greater than the direct conical motion, by 50″ in a year, he produces the phenomenon of the precession of the equinoxes. If we consider that even Newton himself, in tracing the effect of the forces which cause the precession, is thought to have misconceived his own laws of motion, it is not at this part of the mechanics of Copernicus that we need express surprise: and this explanation of the cause of the seasons and of the precession, together with that of the stations, &c. of the planets, must always place him among cosmical discoverers of the first order of sagacity.

All that we have hitherto described will explain the mean motions of the solar system, and the mean motions only. To account for all irregularities, Copernicus (hampered with the notion that all motions must be compounded of circular ones) is obliged to introduce a system of epi-

cycles entirely resembling that of Ptolemy, and which will be most conveniently described under the head PTOLEMAIC SYSTEM. It will surprise many readers to hear that the greater part of the work of Copernicus is taken up with this description of this most essential branch of the real 'Copernican system.' But it must be added that the Copernican epicycles are more successful than the Ptolemaic. The latter were utterly insufficient as a means of *demonstrating* the changes of distance of the planets and earth. The former, founded upon a basis which brought this point not very far from the truth at the outset, made a much nearer approximation to a correct representation of the inequalities. But as the epicyclic system is not now connected with the name of Copernicus, we need pursue this subject no further, satisfied that what we have done will have a tendency to put the reputation of that sagacious investigator in its proper place, and that no mean one, though lower than the one usually assigned to it.

Of the tables of Copernicus, his trigonometrical formulæ, &c., we shall have to speak in their proper places; they are more connected with the sciences they belong to than with his biography.

While Copernicus was in daily expectation of receiving a complete copy of his work from Rheticus, he was seized with hemorrhage, followed by paralysis. The book actually arrived May 23, 1543, and, as Gysius wrote to Rheticus, Copernicus saw it, and touched it, but was too near his end to do more. He died in a few hours after, and was buried in the cathedral to which he belonged.

We copy the following references to sources of information from the 'Bibliog. Astron.' of Lalande, p. 595: Adam, 'Vitæ Phil. Germ.;' Tycho Brahé, 'Orat. de Math.;' Jovius, 'Elog. Doct. Vir.;' Bullialdus, 'Proleg. Astr. Phil.;' Vossius, 'De Sci. Math.;' Crasso, 'Elog. d'Uom. Letter.;' Ghilini, 'Teatro,' tom. ii.; Freherus, tom. ii.; Blount, 'Cens. Cel. Auct.;' Paschius, 'De Invent. Nov. Ant.;' 'Actu Phil.,' part v., p. 884; Zernecke, 'Chronik von Thorn,' 2 ed., Berlin, 1727; 'Pantheon der Deutschen,' 1796; 'Berlin. Monatschrifft,' August, 1792, March, 1793; 'Preussiches Archiv.,' December, 1796; Wieland, 'Teutscher Merkur,' November, 1776. We may here notice that Ghilini asserts an epistle 'De Motu Octavæ Sphæræ' to have been printed; but as Gassendi had never seen it, and we can find no mention of it, we conclude no such epistle was published, though one with that name was certainly written.

COPING, the stone or brick covering of a wall, a term perhaps derived from the Italian *coprire*, to cover. Some think it is derived from the German *kopf*, or Dutch *kop*, the head. Coping-stones are placed on the tops of walls to protect them from the weather. Flat coping is called *parallel coping*, and is used upon inclined surfaces, as on the gables and parapets of houses, and also on the tops of garden and other walls. *Feather-edged* coping has one edge thinner than the other. *Saddle-back* coping is thicker in the middle than at the edges. Coping-stones should project over the walls which they cover, and should have a groove or *throating* underneath the projected part to throw off the water. The coping of Gothic battlements and the walls of churches, castles, and dwellings in the Gothic style of architecture, have a deep throating in the form of a bold cavetto in front, and are sometimes decorated with mouldings. [BATTLEMENT.] York stone is much used for parallel coping, and also Portland, but the latter is more expensive and not so durable. Bath stone coping is often used for Gothic works, but it is not calculated to withstand long the constant action of the weather.

COPLEY, JOHN SINGLETON, was born at Boston, in the United States, July 3, 1737. His father, who was of English extraction, resided in Ireland until his removal to America, which took place so immediately before his son was born, that Ireland has claimed him as a native. He was educated in America; and without the aid of instructors, simply by studying from nature in the groups around him and the neighbouring woods, he taught himself to paint. In 1760 he sent a picture of a 'Boy and Tame Squirrel' to the exhibition of the Royal Academy, which was universally admired. By the year 1767 he was in the receipt of a considerable income as a portrait painter, and was well known both by his works and by name to his brother painters on this side of the Atlantic. In 1774 he indulged a long-felt wish to visit Italy, which he reached by way of London. In the following year he returned to London, and established himself in George Street, Hanover Square. In 1777 he was elected an associate of the Royal Academy; and in 1783 he became a member. He died in 1815. One of his children, now Lord Lyndhurst, possesses some of his father's best paintings.

The best known of Copley's works is the 'Death of Lord Chatham,' which includes some valuable portraits. It was engraved by Bartolozzi on a plate of an unusual size, and the engraving was extensively sold. The painter sent an impression to General Washington, and another to John Adams. He painted many historical subjects, some sacred, and not a few illustrating the history of England, particularly the period of the Revolution. Perhaps the most spirited design from his pencil is the death of Major Pierson, a young officer who died in the defence of St. Helier's, in Jersey, against the French, at the moment when his troops gained a victory over an enemy of superior numbers. There is a dryness and stiffness of manner in Copley's paintings generally, which is less observable in this picture. It is among those in the possession of Lord Lyndhurst. (A. Cunningham.)

COPPER is one of the metals with which the Greeks were acquainted, under the name of χαλκός (chalcus): it was used by them, alloyed with tin, for cutting and warlike instruments, before iron was known, or at any rate before it was common.

The word copper is said to be derived from the Island of *Cyprus*.

Copper has a red colour, and is capable of receiving a good polish; when warmed or rubbed it emits a disagreeable smell, and it imparts a nauseous taste: all its preparations are poisonous. Its density varies according to circumstances; Berzelius states that he found the specific gravity of fused copper to be 8·83, the same when drawn into a cylinder of two lines in thickness 8·946, and when laminated 8·958. Copper is malleable both when hot and when cold, and it may be reduced to very thin leaves; it is also very ductile, and may be drawn into fine wire. After iron and platinum it is the most tenacious metal: a wire $\frac{78}{1000}$ of an inch in diameter supports a weight of 302 pounds without breaking; it is extremely sonorous, and is a good conductor of heat and electricity. It melts at a temperature intermediate as to the fusing points of silver and gold, or, according to Professor Daniell, at a temperature equal to about 1196° Fahr. In pure dry air it does not readily tarnish or oxidize; but if the air be moist, by long exposure it is first oxidized and then converted into green carbonate.

This metal is one of those which occurs in the greatest number of places and in the largest quantity. It is found, though not in large proportion compared with the whole quantity actually obtained, in a metallic state, and is either amorphous, crystallized in cubes, octahedrons, or dendritic. Its ores are too numerous to admit of a detailed account, and as a mere catalogue would convey but little information, we shall only mention some of the more important. It occurs combined with sulphur, forming black sulphuret of copper, or vitreous copper ore; but principally with sulphur and iron, forming a double sulphuret, commonly called copper pyrites or yellow copper ore: this constitutes nearly the whole of the ore raised in Cornwall. It is found also combined with oxygen, forming the red, or suboxide of copper, or ruby copper ore, and less frequently it occurs as black oxide. It occurs also in the state of combination with some acids, as blue and green carbonate of copper, phosphate, sulphate, and silicate of copper.

Copper pyrites occurs in the north of Europe, in England, especially in Cornwall, Devonshire, and Anglesey, and in many parts of Asia and Africa, and the American continents.

We shall now give a brief statement of the mode of treating this ore, from an account given by J. H. Vivian, Esq., M. P., and published in the 21st vol. of the 'Annals of Philosophy.'

The ores are conveyed from Cornwall and Devonshire to Wales, to be smelted, on account of the supply of fuel in South Wales. By this arrangement the vessels not only carry the smaller quantity of material to the greater, but load back with coal for the use of the engines of the mines.

The principal smelting works are situated on the navigable rivers of Swansea and Neath. The furnaces in which the operations are conducted, are reverberating and of the usual construction; they are of different sizes for different purposes. Thus the calcining furnaces or calciners are from

seventeen to nineteen feet long, and fourteen to sixteen wide, and the melting furnaces are from eleven to eleven and a half feet long, and seven and a half to eight feet wide; the form of the calciner is hexagonal; the melting furnaces are oval flattened at one end.

The processes are eight in number, and the first is:

The calcination of the ore.—The charge of ore usually put into the calciner weighs about three to three and a half tons; it is distributed equally over the brick bottom of the furnace. The process continues twelve hours, and towards the end of it the heat is as great as the ore will bear without fusion. To prevent this, it is frequently stirred during the operation. When this process is over, the charge is drawn out through holes in the bottom of the calciner, and if it has been well conducted the ore is black and powdery. During the calcination the arsenic is expelled and the sulphur is got rid of in the state both of sulphurous and sulphuric acid, and the copper and iron are both oxidized.

Melting of the calcined ore.—The furnace is charged through an aperture placed on the top of it. When the charge is spread over the bottom of the furnace, the door is put up and well luted. Some slags from the fusion of what is called the waste metal are added, not only on account of the copper they contain, but to assist in the fusion of the ore.

In this operation, unlike the first, the object is to melt the charge, and when this has taken place, the door of the furnace is taken down, and the liquid mass is well *rabbled*, or stirred, to allow the metallic sulphuret to separate from the earthy matter. When the latter flows on the former, it is skimmed off, and this being done, fresh charges of calcined ore are added till the metal collected at the bottom of the furnace is as high as the furnace will admit without flowing out at the door; the tapping-hole is then opened, in the side of the furnace, through which the metal flows into a pit of water. It thus becomes granulated, and collects in a pan, which is raised by a crane.

In this process a great proportion of the earthy matter and iron of the ore is got rid of. The granulated metal generally contains about one-third of copper, or is about four times as rich as the average ore; it now consists chiefly of copper, iron, and sulphur. When the ores are refractory they are rendered more fusible by the addition of fluor spar. In this state it is called *coarse metal.*

The slags obtained in this operation are broken up to examine whether they contain any copper, and if so, they are returned to the smelter to be remelted.

Calcination of the coarse metal.—This operation is conducted precisely in the same manner as the calcination of the ore; the charge is nearly of the same weight; it remains twenty-four hours in the furnace; the great object is to oxidize the iron; the heat during the first six hours should be moderate, and afterwards increased to the end of the operation. This is the *calcined coarse metal.*

Melting of the calcined coarse metal.—This is performed in furnaces similar to the melting furnace. To the calcined metal are added some slags from the last operations in the works which contain some oxide of copper, as likewise pieces of furnace bottom impregnated with metal.

In this operation the oxide of copper in the slags becomes reduced by a portion of the sulphur which combines with the oxygen, and passes off as sulphurous acid gas, while the metal thus reduced enters into combination with the sulphuret; sometimes a little uncalcined ore is added to assist the operation, which it does by the sulphur that it contains.

The metal, after the slag is skimmed off, is either tapped into water or into sand beds, according to the mode of treatment to which it is to be subjected in subsequent operations. In the granulated state it is called fine metal: in the solid form, blue metal, from the colour of its surface. The former method is practised when the metal is to be brought forward by calcination; it then contains about sixty per cent. of copper, and it is called fine metal.

Calcination of the fine metal is performed in the same manner as the calcination of the coarse metal.

Melting of the calcined fine metal.—This is effected in the same manner as the melting of the coarse metal; the resulting product contains eighty to ninety per cent. of copper, and is called coarse copper.

Roasting.—This is chiefly an oxidizing process. The furnaces in which it is performed are called roasters, and are of the same kind as the melting furnaces. The pigs of coarse copper obtained by the last process are put into the furnace and exposed to the action of the air at a high temperature, which is gradually raised to the melting point; by this process the expulsion of volatile matter is completed, and the metals are oxidized; each charge is from twenty-five to thirty hundred weight. The metal is fused towards the end of the operation, which is continued for twelve or twenty-four hours, according to the state of forwardness when filled into the furnace, and is tapped into sand beds. The pigs are then covered with black blisters, in which state the copper is known by the name of blistered copper. In the interior of the pigs the metal has a porous honeycombed appearance, occasioned by the gas liberated during the ebullition which takes place in the sand beds on tapping. It is in this state fit for the refinery, the copper being freed nearly from all the sulphur, iron, and other substances with which it was combined.

Refining or Toughening.—The refining furnace is similar in construction to the melting furnaces, and differs only in the arrangement of the bottom, which is made of sand, and laid with an inclination to the front door instead of to one side, as is the case in those furnaces in which the metal is flowed out. The refined copper is taken out in ladles from a pool formed in the bottom near the front door. The pigs from the roasters are filled into the furnace through a large door in the side. The heat at first is moderate, so as to complete the roasting or oxidizing process, in case the copper should not be quite fine. After the charge is run down, if there is a good heat on the furnace, the front door is taken down, and the slags skimmed off. An assay is then taken out by the refiner with a small ladle, and broken in the vice; and from the general appearance of the metal in and out of the furnace, the state of the fire, &c., he judges whether the toughening process may be proceeded with, and can form some opinion as to the quantity of poles and charcoal requisite to render it malleable, or, as it is termed, to bring it to the *proper pitch.* The copper in this state is what is termed *dry.* It is brittle, of a deep red colour inclining to purple, of an open grain, and a crystalline structure. In the process of toughening, the surface of the metal in the furnace is first well covered with charcoal; a pole, commonly of birch, is then held in the liquid metal, which causes considerable ebullition, owing to the evolution of gaseous matter. This operation of *poling* is continued, with the occasional addition of fresh charcoal, so that the surface of the metal may be kept covered, until, from the assays which the refiner from time to time takes, he perceives the grain, which gradually becomes finer, to be perfectly closed, to assume a silky polished appearance in the assays when half cut through and broken, and to be of a light-red colour. He then makes further trial of its malleability by taking out a small quantity in a ladle and pouring it into an iron mould, and when *set,* beating it out while hot on the anvil with a sledge. If it is soft under the hammer, and does not crack at the edges, he is satisfied as to its malleability, or, as they term it, that it is *in its proper place.* He then directs the men to lade it out, which they do in iron ladles coated with clay, pouring it into pots or moulds of the size required by the manufacturer. The usual size of the cakes for common purposes is 12 inches wide by 18 in length.

The process of refining or toughening copper is a delicate operation, and requires great care and attention on the part of the refiner to keep the metal in the malleable state. Its surface should be kept covered with charcoal, otherwise it will go back between the rounds of lading, in which case fresh poling must be had recourse to: the cakes are allowed to cool in the pot, and others are laded thereon. Overpoling is to be avoided, as the metal is thereby rendered even more brittle than when in the dry state: its colour also becomes a light yellowish-red, and its structure fibrous. When this is found to be the case, or, as they say, it is *gone too far,* the refiner directs the charcoal to be drawn off the surface of the metal, and thus by taking down the side door and exposing the copper to the action of the air, it is brought back to its proper pitch; that is, it again becomes malleable.

Copper for brass-making is granulated, in order that its surface may be increased, and it may thus combine more readily with the zinc or calamine. This is effected by pouring metal from the ladles in which it is taken out of the furnace into a large ladle pierced in the bottom with holes, and supported over a cistern of water. The water may be either hot or cold, according to the form to be given to the metal. When warm, the copper assumes a round

form, and is called *bean shot*. When a constant supply of cold water is kept up, the metal has a light ragged appearance, and is called *feathered shot*. The former is the state in which it is prepared for brass wire making. Another form into which copper is cast, chiefly for export to the East Indies, is in pieces of the length of six inches, weighing about eight ounces each: these are called *japan copper*. The copper is dropped from the moulds immediately on its becoming solid into a cistern of cold water, and thus, by a slight oxidation of the metal, the sticks of copper acquire a rich red colour on the surface.

Various important applications are made of copper in the state of sheets or rolled copper. Copper, like most of the unmixed metals, is generally rolled hot, being malleable at all degrees of heat till it approaches its melting point. Most of its alloys with zinc, frequently called spelter, known in commerce by the general term brass, are malleable only when cold, with the exception of one or two lately brought into use, which are extremely malleable at a certain high temperature. Copper for the purpose of rolling leaves the smelting works in cakes about 12 × 18¼ inches thick, each weighing about 90 lbs. The cakes are then put into *muffles*, where they are uniformly heated; the degree of temperature depends on the quality of the copper; in general it is something beyond a bright red heat. In this state they undergo the process technically called *breaking down*, which consists in passing them between strong cast-iron cylinders as in the rolling of iron, the rolls being forced nearer together so as to diminish the intermediate space after each passage of the cakes through them. This process is continued until the cake is lengthened about five fold, by which time it has become too cold for further procedure in that stage. It is then cut by strong shears into pieces, called blanks, of the required weight, which are heated in the muffle and rolled out till they are twice as long as broad. Being again heated, they are now doubled, and thus rolled crosswise till they reach the required lengths, though in this process of finishing it becomes necessary frequently to heat them, and when the sheets are thin to roll several thicknesses together. The oxide of copper, which has in process of rolling been pressed in the surface, must now be removed; to effect which each sheet is first dipped into a saline mixture, and then put into the muffle. When red hot it is withdrawn and plunged into cold water, where the scale or oxide is suddenly cooled, and by its contraction is separated from the sheet and falls to the bottom, leaving the surface of the copper clean. This process also softens the sheet, which is now fit to be worked into any form. The only remaining process is that of shearing the edges, which is effected by a pair of circular shears, which, when required, cut both edges at the same time. Copper is sometimes rolled cold after it has undergone the process of breaking down, as above described, in the same manner as brass; it is generally rolled thus when it is needed hard in texture and bright on the surface.

We shall now describe the more important compounds of copper.

Oxygen and copper may be readily made to combine, and in two proportions; when copper is merely heated, scales are formed upon it, which, when removed, are found to consist of a suboxide and protoxide of copper. If these scales be reduced to powder and heated in dilute sulphuric acid, a red powder is left and a blue solution is obtained. This red substance is the suboxide of copper, and is composed of

1 equivalent of oxygen	8
2 equivalents of copper 32 × 2	64
equivalent	72

it is therefore a dioxide.

This oxide exists in nature, and occurs in Cornwall in the form of beautiful transparent crystals of a fine red colour, and is hence frequently called *ruby copper*. This oxide is not soluble in acid unless it acquire additional oxygen by the act of solution Thus it is not acted upon by dilute sulphuric acid either hot or cold; but when heated with the concentrated acid, it is decomposed, sulphurous acid being evolved and oxide of copper formed with the oxygen of the decomposed acid. It undergoes the same change by nitric acid, which it decomposes, and combines with the oxygen of it. In muriatic acid it is soluble, but then becomes a chloride from which water throws down a white subchloride and potash yellow or orange dioxide. With ammonia it forms a colourless solution, which becomes speedily blue by the oxidizement that occurs on exposure to the air. This oxide, it is evident from what has been stated, forms no salt with any acid.

Oxide or protoxide of copper. When the scales which have been described as falling from copper by the application of heat and air, are subjected to a high temperature with access of air in a crucible, the whole quantity is converted into protoxide of copper; or when the blue solution, already mentioned as obtained from the scales, is boiled with excess of potash, first a blue precipitate, which is *hydrate of copper*, is obtained, and in a short time it loses water and becomes black—this is the protoxide of copper, consisting of

1 equivalent of oxygen	8
1 equivalent of copper	32
equivalent	40

It may also be obtained by means of potash from any other salt of copper. The properties of this oxide are that it is black, insoluble in water; it combines with acids in general, and is the base of all the salts of copper. It dissolves in ammonia, to which it imparts a splendid blue colour; but it is insoluble in the fixed alkalis. When the vapour of water is passed over ignited copper, the copper is not oxidized, and no hydrogen is consequently given out; it appears therefore that the affinity of copper for oxygen is not very great. This oxide is is not decomposed by the mere action of heat. It sometimes, though more rarely than the dioxide, occurs in nature. It imparts a green colour to glass generally, but by particular management may render it blue.

Azote, hydrogen, and copper do not combine.

Chlorine and copper unite to form two chlorides; the sub or dichloride may be obtained by exposing copper filings to the action of chlorine gas, not in excess; or by evaporating, with as little contact of air as possible, a solution of dioxide of copper in muriatic acid.* It is a yellow, translucent, crystalline compound, which is insoluble in water, but dissolved by muriatic acid, from which water throws down a white precipitate, and potash a yellow one. It is applied to no use: it is composed of

1 equivalent of chlorine	36
2 equivalents of copper	64
equivalent	100

When this is exposed to the air it becomes green, and is probably converted into an oxichloride; the same substance is produced by exposing copper to the action of muriatic acid and the air. It is usually called submuriate of copper; this compound is also found in Peru, and is called the *green sand of Peru*, or *Atacamite*.

Chloride of copper may be formed by dissolving the oxide or protoxide of copper in muriatic acid, when a fine green coloured solution is procured, which by evaporation to dryness at a temperature not exceeding 400° leaves chloride of copper; this compound is yellow, and soluble in water, and composed of

1 equivalent of chlorine	36
1 equivalent of copper	32
equivalent	68

Sulphur and copper combine very readily at a moderate temperature. The compound occurs in nature, and is frequently called *vitreous copper*. It is composed of

1 equivalent of sulphur	16
2 equivalents of copper	64
equivalent	80

It is therefore a disulphuret of copper. It may be prepared artificially by heating a mixture of sulphur and copper. The native compound is black, frequently shining, and crystallizes in six-sided prisms, &c.; it is met with also amorphous. The artificial compound is brittle and brownish-black. When exposed to heat and air the sulphur is expelled and oxide of copper remains. Nitric acid converts it into sulphate of copper; the same effect is produced by exposing the artificial compound to air and moisture.

Sulphuret of copper is obtained by adding sulphuretted hydrogen gas to any salt of the oxide of copper, as the sulphate, nitrate, &c. A black precipitate is thrown down, which contains twice as much sulphur as the last mentioned, or it is composed of

1 equivalent of sulphur	16
1 equivalent of copper	32
equivalent	48

No use is made of this compound: it is converted into sulphate by treatment with nitric acid. It is not acted upon by dilute acids in general.

Bromine and copper.—This compound is in the form of small translucent plates. It is insoluble in water: muriatic acid dissolves without decomposing it; but neither sulphuric nor acetic acid, even when concentrated and boiling, has any action upon it. When heated out of the contact of air, it remains undecomposed; whereas, when the air is present, vapour is emitted, which gives the flame a green colour, and oxide of copper remains in the crucible. It is composed of—

1 equivalent of bromine . .	78
1 equivalent of copper . .	32
equivalent	110

Bibromide of copper may be formed by dissolving oxide of copper in hydrobromic acid; it is a deliquescent salt, which crystallizes in yellow needleform crystals. It contains two equivalents of bromine.

Iodine and copper combine to form iodide of copper. The compound is, however, but little known; when an alkaline iodide is poured into a solution of copper, a grey precipitate is obtained, which appears to be a mixture of iodine and iodide of copper.

Fluorine and copper. These substances combine; but little is known respecting the compound. When carbonate of copper is dissolved in hydrofluoric acid, carbonic acid is evolved, and an insoluble compound, which appears to be fluoride of copper, is formed.

Selenium and copper. When seleniuretted hydrogen gas is passed into a solution of copper, black seleniuret of copper is formed and precipitated; when dried, it has a deep grey colour, and is susceptible of a polish. When heated, it loses half of its selenium, and a button of seleniuret of copper remains.

Phosphorus and copper, when heated together, form a fusible white, crystalline, hard, brittle phosphuret. It is best obtained by passing the vapour of phosphorus over copper wire heated to redness. It is a diphosphuret composed of—

1 equivalent of phosphorus .	16
2 equivalents of copper .	64
equivalent .	80

Copper and other metals form *alloys of copper;* those which result from its union with tin and with zinc are the most important. Some of the former have already been noticed under the head of bronze and bell-metal, and of the latter under that of brass. *Tutenag* is said to be an alloy of copper, zinc, and a little iron; and *tombac, Dutch gold, similor, Prince Rupert's metal,* and *Pinchbeck* are alloys containing more copper than exists in common brass. *Mannheim gold* is a peculiar alloy of copper and zinc, which is said to consist of three parts of copper and one part of zinc. The new standard measures made by Mr. Bate were formed from an alloy 57·6 parts copper, 5·9 tin, and ·18 brass. This was preferred on account of its being less liable to oxidize than brass. *Packfong,* or the white copper of China, is an alloy of copper, nickel, and zinc, now extensively employed in this country under the name of *German silver:* it is nearly as white as silver, and takes a fine polish; it requires great caution in rolling. According to Dumas, that which is used for spoons and forks consists of copper 50, nickel 25, zinc 25; these proportions being slightly varied for different uses. The Chinese packfong, he says, consists of copper 40·4, nickel 31·6, zinc 25·4, iron 2·6 in 100 parts.

Copper and antimony, combined in the proportions 3 parts of the former to 1 part of the latter, is lamellar, brittle, and has a violet colour; but when equal quantities of the metals are used, the compound has not this colour, and it becomes whiter as the proportion of antimony is increased.

Copper and arsenic form a greyish white mixture, with a compact granular texture; it is not applied to any purpose whatever.

Acids and oxide of copper form salts, some of which occur in nature, and others are very extensively used in the arts. Our limits will permit the mention of the more important only.

Acetic acid and copper form two salts; namely, the acetate of copper, sometimes called *distilled verdigris,* and the diacetate of copper, or *common verdigris.* The diacetate was formerly prepared almost exclusively in France, by causing the husks and stalks of the grape after wine-making to ferment in contact with copper plates. It is now prepared in England by more direct processes. This salt, when pure, is in the form of light blue acicular crystals, of a silky lustre; they are decomposed by water into acetate, which remains dissolved, and a subsalt, which is precipitated. It is usually obtained in large masses, which have no crystalline form, having been packed while moist in leather bags. This salt is decomposed by the stronger acids, by the alkalis, and by heat. It is much employed as a pigment, and in hat-making, dyeing black, and several processes in the chemical arts. It consists of—

1 equivalent of acetic acid .	51
2 equivalents of oxide of copper	80
6 equivalents of water . .	54
equivalent .	185

Acetate of copper is prepared by dissolving the diacetate in acetic acid; twigs are put into the solution, upon which the salt crystallizes; it is of a beautiful deep green colour, and the form of the crystal is an oblique rhombic prism; it is soluble in five parts of boiling water, and but little soluble in alcohol. When submitted to destructive distillation, it yields very strong acetic acid, with some other products. It is composed of—

1 equivalent of acetic acid .	51
1 equivalent of oxide of copper	40
1 equivalent of water . .	9
equivalent	100

Arsenious and arsenic acid both combine with oxide of copper. The arsenite of copper is employed as a pigment, under the name of mineral or Scheele's green. It is prepared by adding a solution of arsenite of potash to one of sulphate of copper, by which arsenite of copper is formed and precipitated. Arseniate of copper is found in Cornwall in various forms and composition, and constitutes a beautiful series of copper ores. It may be artificially prepared by mixing solutions of arseniate of potash and sulphate of copper.

Carbonic acid and copper combine in two proportions, which may be artificially prepared, and occur in nature. The green carbonate called malachite is found principally in Russia, and is of a fine green colour. It is artificially prepared by mixing hot solutions of sulphate of copper and carbonate of potash. It is composed of—

1 equivalent of carbonic acid .	22
2 equivalents of oxide of copper	80
1 equivalent of water . .	9
equivalent .	111

It is used as a pigment under the name of *green verditer;* it is decomposed by the stronger acids and by heat.

Blue carbonate of copper is found in France and Siberia beautifully crystallized, and is obtained artificially by decomposing nitrate of copper. It is of a fine light blue colour, and known by the name of *refiners' verditer.* It is employed as a pigment, especially as a water colour for paper-hangings. It is composed of—

2 equivalents of carbonic acid	44
3 equivalents of oxide of copper	120
1 equivalent of water . .	9
equivalent	173

It is decomposed in the same way as the green carbonate. ¶

Nitric acid and copper readily combine; the salt may prepared either by dissolving the metal or the oxide of copper in the acid; it is a crystalline deliquescent salt, which dissolves readily in water and in alcohol. Much of this salt is formed by the silver refiners by precipitating silver from solution by copper; it is then used for making *blue verditer*. It is composed of—

1 equivalent of nitric acid	54
1 equivalent of oxide of copper	40
equivalent	94

When carbonate of lime is added to the solution, a subnitrate is precipitated.

Phosphoric acid and copper, from phosphate of copper. This salt occurs native in crystals, and may be artificially prepared by mixing nitrate of copper with phosphate of soda. It is a light blue precipitate, insoluble in water, and readily dissolved by acids. There probably exist two or three phosphates. It is not an important salt.

Sulphuric acid and copper form *sulphate of copper, blue vitriol*, or *Roman vitriol*, or *blue copperas*. It is prepared in large quantity for the use of the colour-maker and dyer, and is one of the most useful of the salts of this metal. It is readily prepared by dissolving the oxide in the dilute acid; by evaporation large and beautiful blue crystals are obtained, which have the form of rhombic prisms. This salt is soluble in about four parts of water at 60°, and in two parts at 212°. When heated, it loses the greater part of its water of crystallization, and becomes powdery and white; by a very strong heat the sulphuric acid is expelled, and oxide of copper is left; when solutions of the alkaline carbonates are added to a certain extent, subsulphate of copper is precipitated; and this is used as a pigment. It is composed of—

1 equivalent of sulphuric acid	40
1 equivalent of oxide of copper	40
5 equivalents of water	45
equivalent	125

These are the principal salts of copper; but many more may be prepared. These salts are all either blue or green when combined with water; they are all decomposed by potash and soda, which at first throw down blue hydrate of copper, which, when heat and the alkali are used in excess, becomes black oxide. The soluble salts of copper are all precipitated of a reddish-brown colour by the ferrocyanide of potassium, yield a black sulphuret with hydrosulphuric acid, are soluble in ammonia, and yield a precipitate of metallic copper when iron is put into their solutions.

The uses of copper are so numerous, that it would require a volume to describe them all. It is used for coin, for making boilers and numerous utensils, for covering the bottoms of ships and the tops of houses, and in the construction of voltaic batteries. Its various important alloys are mentioned under the heads of BRASS, BRONZE, BELL-METAL, &c.

Copper, in a metallic state, produces no action in the human system. When in the form of oxide, its action is considerable, though variable, being dependent on the kind and quantity of acid which it may meet with in the stomach: but all its salts occasion peculiar effects, which may be fatal if the dose be large. It is not necessary that the substance should be introduced into the stomach, for the salts of copper act in whatever way they are introduced into the system, and the more energetically, the more directly they enter the blood. The greater the degree of solubility, the more rapidly are the formidable symptoms displayed. The preparations of copper used in medicine are, the sulphate, or blue vitriol, called also blue-stone; the ammoniated sulphate or ammoniuret; and the diacetate, or verdigris. The two former are used internally, the latter rarely; it and the sulphate being applied by surgeons to wounds and sores in particular states.

Sulphate of copper influences powerfully the nervous system, and acts as a tonic and antispasmodic: it has also some astringent properties. In a considerable dose it causes vomiting; in still larger doses it causes purging, accompanied with tenesmus, followed by convulsive agitation of the head, or rigidity amounting to tetanic, laborious respiration, pain and tightness of the head, insensibility, lethargy, and speedy death. In some instances the narcotic symptoms are the first to be displayed, those of irritation succeeding; jaundice, if the patient survive, or yellowness of the corpse is no uncommon occurrence, a fact to be borne in mind as a distinctive mark of poisoning by copper among metals: the same sign, however, occurs in poisoning from aconite and most ranunculaceous plants. If the effect of the poison when copper has been taken has been speedy, few traces of morbid action are found in the intestinal canal; and 'too much reliance ought not to be placed on mere bluish or greenish colouring of the membranes of the stomach; for Orfila and Guersent have both observed that the inside of the stomach as well as its contents may acquire these tints in a very remarkable degree in consequence of natural disease.' (Christison.)

In cases of slow poisoning by copper, such as happen when some of its salts in substance or solution have been taken daily for a considerable time, fatal results follow; and the copper may be detected accumulated in the liver, though not discoverable in any other organ of the body. The circumstance of the copper being carried to the liver explains the frequent occurrence of jaundice, as stated above.

In small medicinal doses, sulphate of copper has been employed in diarrhœa, which, when chronic, it often checks: even in Asiatic cholera it has proved useful. Indeed it seems to check augmented secretion from all mucous surfaces, on which account it may be used in chronic discharges from the urino-genital organs, and also of the lungs, to benefit which last organ it is usually given as an emetic. It may likewise be employed as an emetic in cases of poisoning by narcotic agents, in preference to tartrate of antimony or ipecacuanha, as its action is not preceded by nausea, which promotes the absorption of the poisonous agent.

Its chief internal use, however, is as a tonic and antispasmodic, in many convulsive and nervous diseases, such as epilepsy and chorea. In these last-named diseases the ammoniacal sulphate is often to be preferred, given in the form of pill. Sulphate of copper is however in most frequent use by surgeons as an external application to wounds, when indolent, or filled with the unhealthy kind of granulations termed 'proud flesh.' it is similarly used in some forms of ophthalmia, especially of the inner surfaces of the eyelids.

Diacetate of copper is rarely given internally; but it is the frequent source of accidental or intentional poisoning, when its general effects are nearly the same as those of the sulphate. In the form of a liniment it is of great utility in certain affections of the mouth and gums, applied by means of a camel's-hair brush. Likewise as an ointment to stimulate old and indolent ulcers it is superior to all other means.

Poisoning often results from the formation of verdigris in copper vessels used in cooking, or the more reprehensible practice of putting copper coins into pickles to make them a fine green colour. It seems that copper vessels, if kept clean, are not dangerous, provided whatever is boiled in them (unless of an acid nature, which will always form some dangerous compound,) be not allowed to stand to cool in the vessel, but be instantly poured out. Tinning the interior of copper vessels affords protection so long as the tinning remains entire. In case of poisoning, the best antidotes are whites of eggs, milk, or wheat flour; ferrocyanate of potass, or iron filings in gum-water, may be given; sugar or any syrup is useful. But liver of sulphur should never be given, and least of all should vinegar.

COPPER, STATISTICS OF. No effective attempt has ever been made to ascertain the actual productiveness of the mines in this country, and all that is hitherto known on that subject is derived from partial inquiries of individuals. By this means a tolerably accurate account has been taken of the produce of the copper mines in Cornwall, reaching back to 1771, with the exception of a few intermediate years, the returns of which are wanting. Since 1821 similar accounts have been procured of the produce of other mines in the United Kingdom. The average annual produce of the Cornish mines at different periods between 1771 and 1820, was as follows: 1771 to 1775, 3450 tons; 1776 to 1780, 3310 tons; 1781 to 1785, 3990 tons; 1796 to to 1800, 5174 tons; 1801 to 1805, 5544 tons; 1806 to 1810, 6575 tons; 1811 to 1815, 7181 tons; 1816 to 1820, 7018 tons. Since then the annual produce has been as follows:—

Years.	Copper produced from Ores sold in Cornwall.	Copper produced from ores sold at Swansea.	Produce of Devonshire and Staffordshire	Produce of Isle of Anglesey.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.
1821	8,515	314	871	558	10,288
1822	9,140	388	716	774	11,018
1823	7,927	353	694	705	9,679
1824	7,823	605	654	623	9,705
1825	8,226	729	667	736	10,358
1826	9,026	668	615	784	11,093
1827	10,311	772	562	681	12,326
1828	9,921	977	533	757	12,188
1829	9,656	1,221	454	726	12,057
1830	10,748	1,196	510	778	13,232
1831	12,044	1,240	486	915	14,685
1832	11,947	1,320	400	783	14,450
1833	11,191	1,158	406	505	13,260
1834	11,224	1,580	538	700	14,012
1835	12,270	2,832			

The copper yielded by the British mines being more than sufficient for the use of the kingdom, a considerable quantity is exported every year, both in its unwrought and in a manufactured state. The exports since 1820 have been:

Years.	Unwrought	Coin.	Sheets, nails, &c.	Wire.	Other sorts of wrought copper.	Total quantity exported.
	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.
1820	41,155	10	58,121	8	22,663	121,958
1821	34,543	155	66,676	21	24,035	125,431
1822	25,829		65,070	40	22,731	113,671
1823	24,082	802	56,146	98	25,387	106,516
1824	19,209	95	62,920	292	23,580	106,096
1825	10	2131	51,437	40	25,002	78,624
1826	2,604	1807	65,264	11	26,307	95,994
1827	26,583	1450	74,943	8	40,439	143,424
1828	21,591	1150	52,412	71	48,897	124,121
1829	52,978	15	59,871	13	46,643	159,521
1830	59,722	640	66,331	16	56,443	183,154
1831	67,200	96	70,477	149	32,690	1.0,613
1832	77,497	2	79,944	13	37,155	194,612
1833	47,887	15	91,366	16	16,947	156,233
1834	81,978		81,363	44	14,344	177,731
1835	63,252		103,433	56	15,197	182,225

In the accounts of exports of English produce and manufactures exported, the Custom House statements include brass and copper manufactures together; the total quantity and declared value of these shipments in each year, from 1827 to 1835, have been as follows:

	cwts.	Decl. Value.		cwts.	Decl. Value.
1827	147,222	786,955*l*.	1832	213,482	916,563*l*.
1828	128,106	678,786*l*.	1833	192,974	884,149*l*.
1829	161,241	812,366*l*.	1834	205,960	961,823*l*.
1830	189,592	867,344*l*.	1835	242,095	1,094,749*l*.
1831	181,951	803,124*l*.			

The principal shipments in 1835 were made to the following countries, viz.: India, 73,377 cwts., 316,120*l*.; France, 67,832 cwts., 298,903*l*.; United States of America, 35,626 cwts., 166,060*l*.; Netherlands, 16,409 cwts., 75,027*l*.; Brazil, 8265 cwts., 39,429*l*.; Italy, 8106 cwts., 35,902*l*.; British West Indies, 6080 cwts., 32,393*l*.; Foreign West Indies, 4595 cwts., 21,554*l*.; and British North American Colonies, 2571 cwts., 12,792*l*.

Within the last few years a considerable quantity of copper ore has been brought to England for the purpose of its being smelted and re-exported in the metallic state. These importations, which have come chiefly from Colombia and Chile, have been, 1825, 2 cwts.; 1826, 1297; 1827, 659; 1828, 6693; 1829, 24,258; 1830, 28,733; 1831, 50,919; 1832, 79,115; 1833, 118,632; 1834, 139,740; 1835, 278,900. (*Tables of Revenue, Population, Commerce, &c. of the United Kingdom, compiled at the Board of Trade*, parts 3, 4, and 5.)

COPPER, ALLOYS OF. [COPPER.]

COPPER, ORES OF. [COPPER.]

COPPER-NICKEL. [NICKEL.]

COPPER-PLATE. [ENGRAVING.]

COPPER-MINE RIVER is a river in North America, which falls into the Arctic Ocean. It rises in a rocky country, near 65° N. lat. and 112° W. long., where a series of lakes unite and form the river. The most southern of these lakes is Lake Providence (about 64° 50′ N. lat.). The river first runs nearly due north, until it has passed 66° 30′ N. lat., when it turns west and flows along the foot of a rocky, but not high chain of mountains. Having attained 116° 30′ W. long. it turns abruptly north, and breaking through the mountains continues its course in a northern direction to its mouth 65°50′ N. lat., and a few minutes east of 116° W. long. Its whole course may be about 300 miles. It contains numerous rapids, but none which form insuperable difficulties to canoes and boats which descend the river. The most difficult part is the Bloody Falls, about 10 miles from the mouth. Hearne discovered the mouth of this river in 1771, and it was the first place on the coast of the Arctic Sea of America which was visited by Europeans. Sir J. Franklin descended the greatest part of the river in his first journey. (Franklin and Richardson.)

COPPERAS. There are three metallic salts which are occasionally called copperas, as sulphate of copper (blue copperas), sulphate of iron (green copperas), and sulphate of zinc (white copperas).

COPPICE, a wood or plantation of various kinds of trees, which shoot up from the root when cut down, and which are periodically cut down before they acquire any considerable size. The most common trees planted or used for this purpose are the oak, the chestnut, the maple, the birch, the ash, and the willow. The hazel and the alder are also frequently planted in coppice, the former in dry and chalky soils, the latter in moist and marshy situations. Timber trees are generally allowed to grow in coppice, or more properly the coppice is the underwood where timber is the principal object. There is a doubt, however, whether it is judicious to allow many trees to stand where there is a ready sale for coppice wood. The quick return of the latter overbalances the greater price of old timber. In consequence of this opinion, large trees fit for ship-building, which require a long time to arrive at the required size, are become very scarce; and many woods, once thickly studded with majestic trees, are reduced to mere coppice wood. The value of a well-managed coppice is considerable where the produce can be readily manufactured into useful articles, and carried to a good market. Ash hoops, hop-poles, chestnut gate-hurdles, and sheep-hurdles are the principal articles manufactured or prepared in a newly-cut coppice. What is of no use for these purposes is made into faggots for fuel, where this is scarce, or converted into charcoal, which is more easily transported. A good coppice will bear to be cut down every eight or nine years, and will thus be worth, according to situation, from 6*l*. to 15*l*. per acre, or even more, when sold to those who undertake to cut and prepare the wood.

Little attention is generally paid to the coppice, except when it is fit to be cut, but this is a great mistake: with a little attention a coppice may be doubled in value in a few years. It should be carefully drained where the water has not a ready outlet. Where the most profitable kinds of wood are deficient fresh plants should be supplied. The whole should be kept well stocked, but not overstocked; and the pruning-knife should be used where it appears necessary, especially where hop-poles are in request, which usually bear a good price. Hop-poles require a longer time to attain the proper size, and more room to grow. For this purpose the coppice may be thinned out, without being entirely cut down. When a coppice is cut, attention must be paid to the manner in which the poles and rods are cut off from the stem. They should be divided by a clean slanting cut with a very sharp axe or bill-hook, so as not to shatter the stump which is left. The wound will then soon heal over, and the stump will not be injured by the wet and decay, as is too often the case. When fresh ground is planted for a coppice, it should always be previously trenched and drained. The extra expense of this will soon be repaid. Scotch firs may be planted at first as nurses and shelter to the oaks and other forest trees. In seven or eight years the firs will have acquired a considerable height, and may be thinned out or cut down: they never shoot again from the root. The other trees may be left to grow a few years longer before they are cut down. After the first cutting, attention must be paid to the stumps and all superfluous shoots removed. In seven or eight years a thick coppice will be formed, which will increase in value every time it is cut, and will produce a very good annual rent for land which would not have been profitable in cultivation, either as pasture or arable farms. The annual expense of a coppice is trifling, and the regular returns are certain and profitable. When a portion of coppice is cut every year, so as to have a regular rotation, the income is as regular as that of any other part of an estate. A proportion of coppice on an estate is essential to the production of game and to its preservation.

The ground most favourable for coppice is that which is too steep or rocky for cultivation, and where the climate will not allow of the vine. Where the land is flat, and can be well drained, arable farms will always be most profitable,

ss in some poor sandy soils, where corn will not grow out extraordinary manuring, while the roots of some s of trees will sink to a great depth and find there the rishment necessary to their growth. In such sandy the birch, the maple, and the acacia sometimes grow uriantly, when the grass on the surface scarcely shows s of vegetation. On wet and boggy soils the willow and e alder are almost the only trees that will thrive. Whoer plants a coppice must be well acquainted with the soil to considerable depth, and must choose his plants accordingly.

COPT, the name given to the Christian descendants of the antient Egyptians. It is correctly pronounced either Ckoobt or Ckibt, and it is generally believed that the name is derived from Coptos, once a great city in Upper Egypt, now called Ckooft or Gooft, to which, during their persecution by the Roman emperors, many of the Egyptian Christians retired. They are not an unmixed race, their ancestors in the earlier ages of Christianity having intermarried with Greeks, Nubians, and Abyssinians. The secession of the early Christians of Egypt from the Church of Constantinople occasioned bitter enmities to spring up between them and the Greeks, on which account they suffered so much persecution, that they united with the Arab invaders of their country to expel the Greeks; but though their revenge was gratified, they were compelled to bow to a heavier yoke. With the exception of a small proportion who profess the Romish or the Greek faith, the Copts are Christians of the sect called Jacobites, Eutychians, Monophysites, and Monothelites, whose creed was condemned by the council of Chalcedon A.D. 451. The number of churches and convents in ruins prove that the Copts were once far more numerous than at present: they do not now compose more than one-fourteenth part of the population of Egypt, their number not exceeding 150,000, about 10,000 of whom reside at Cairo. Conversions to the Mohammedan faith, and intermarriages with the Moslems, have occasioned this decrease in their numbers; to which may be added the persecutions which they endured from their Arabic invaders and subsequent rulers. They were forced to adopt distinctions of dress, and they still wear a turban of a black or blue, or a greyish or light brown colour, in contradistinction to the red or white turban. The distinction is generally carefully observed in the towns, but less so in the villages. Under the dominion of the present Báshaw of Egypt, the Copts are not now the despised race they once were: some of them have even been raised to the rank of Beys. The male adults pay a tribute, besides the income tax which they pay in common with the rest of the inhabitants; but they are exempt from military service. This immunity is the result of Moslem prejudice.

In some parts of Upper Egypt there are villages exclusively inhabited by the Copts, and in every village of moderate size is a Mo'al'lim (a title given to all Copts except those of the poor class or peasants), who keeps the register of the taxes. Most of the Copts in Cairo are employed as secretaries and accountants, or tradesmen; they are chiefly engaged in the government offices; and as merchants, goldsmiths, silversmiths, jewellers, architects, builders, and carpenters, they are generally considered more skilful than the Moslems. In the villages they are employed in agriculture, like the rest of the peasantry. The patriarch, or head of the Coptic church, judges petty causes among his people in the metropolis, and the inferior clergy do the same in other places; but an appeal may be made to the cadi. A Moslem aggrieved by a Copt may demand justice either from the patriarch or cadi, but a Copt who seeks redress from a Moslem must apply to the cadi. The Copts are somewhat under the middle size. They are extremely bigoted, and bear a bitter hatred to all other Christians; they are of a sullen temper, extremely avaricious, great dissemblers, ignorant, and faithless. In their habits they scarcely differ from their fellow-countrymen. Their dress, with the exceptions already noticed, is similar. The women veil their faces, according to the custom of the country. The Copts frequently indulge in excessive drinking; but in their meals, their mode of eating, the manner in which they pass their hours of leisure, which is chiefly in smoking their pipes and drinking coffee, they resemble the other inhabitants of the country.

The Coptic language is now understood by few persons, and the Arabic being adopted in its stead, it may be considered a dead language. There are numerous schools, but for boys only; very few females among them can read, and those have been instructed at home. The boys are taught the Psalms of David, the Gospels, and the Apostolical Epistles, in Arabic; and then the Gospels and Epistles in Coptic. The antient language is not understood grammatically; and there are scarcely any who can do more than repeat what they have committed to memory of the Scriptures and Liturgy. The Coptic fell gradually into disuse after the Arab conquest; in Lower Egypt the inhabitants had ceased to speak and to understand it before the tenth century, but in Upper Egypt it lingered several centuries longer. All the Copts who have been instructed at school still pray, both in the church and in private, in Coptic; and the Scriptures are always read in the churches in that language; but they are explained from books in Arabic. The British and Foreign Bible Society has printed the Psalter and Gospels in Coptic and Arabic.

The Coptic hierarchy consists of a patriarch, a metropolitan of the Abyssinians, bishops, arch-priests, priests, deacons, and monks. The patriarch is styled 'Patriarch of Alexandria,' but generally resides in Cairo. He is usually chosen by lot, and always from several monks of the convent of St. Anthony, in the Eastern Desert, who are nominated by the superior. He continues to observe the monastic regulations, one of which is to remain unmarried. The metropolitan of Abyssinia, who always resides within his diocese, is appointed by the patriarch, and retains his office for life. The number of bishops is twelve, who are generally chosen from the monastic order. The arch-priests are numerous, and are selected from among the priests. The priests are required to be of the age of thirty-three years at the least, and are not permitted to marry, though they may have married before taking the priesthood; but if the wife dies they cannot marry again; and the widow of a priest is not allowed to marry a second husband. The priests are supported only by alms and by what they obtain by their own industry. A deacon must be either a person unmarried, or have been only once married to a virgin bride. By taking a second wife he loses his office. The monks undergo a severe novitiate, and take the vow of celibacy. The churches contain ill-executed and gaudy pictures of various saints, but no images are admitted. The number of Coptic churches and convents is said to amount to 146, but the former are few in comparison with the latter. The form of service is not characterized by much solemnity, and the conduct of the priests is often somewhat indecorous. Baptism is practised under a belief that if the ceremony be omitted the child will be blind in the next world. The children are generally circumcised; but in Cairo the custom is less strictly observed than in other parts of the country. Confession is required of all members of the Coptic church, and is indispensable before receiving the Lord's supper. Wednesday and Friday are observed as fast-days, except during the fifty days immediately following the Great Fast. The seven great festivals are as follows:—the Nativity of Christ, Baptism, the Annunciation, Palm Sunday, Easter, the Ascension, and Whit-Sunday. The Copts are not allowed by their church to intermarry with persons of any other sect.

The most recent notice of this people (from whence the above statements are taken) is contained in the second volume of *An Account of the Manners and Customs of the Modern Egyptians, written in Egypt during the years* 1833-34 and 1835, by Edward William Lane; 2 vols., London, 1836.

COPTIC LANGUAGE. We designate by the term Coptic the language spoken and written by the inhabitants of Egypt since the introduction of the Christian religion into that country; and we distinguish it from the more antient Egyptian language, which was in use under the Pharaohs and the Ptolemies. The origin of the word *Copt* is doubtful; some have derived it from the name of the city Coptus: we are inclined to recognise in *Copt* the main part of the antient name of the country Αἰγυπτος. The name *Copts* seems to have been used as the common designation of the Christians in Egypt from the time of the Emperor Heraclius, when the patriarch Benjamin was permitted to return from his exile in the Thebaïs (about A.D. 644) and to resume his functions as a bishop at Alexandria. (Le Quien, *Oriens Christianus*, ii. 481.) What was the relation of the antient to the more recent language of Egypt, we are as yet unable to determine, as our information respecting the former is very imperfect. From the analogy however of other languages, the successive changes

of which can be traced with tolerable accuracy, we are warranted in supposing that the old Egyptian language bore a relation to the Coptic, similar to that which the Latin does to the Italian, the Zend to the modern Persian, or the Sanscrit to many of the vernacular dialects now spoken in India. Though we cannot here support the assertion by any direct evidence, we may consider it as an established fact, that the antient Egyptians possessed an extensive written literature, besides the monumental inscriptions which still exist. It is by no means probable, that the conquest of Egypt by Cambyses, or the period of Persian dominion which followed that event, should have materially injured the literature of the country; and the subsequent dynasty of the Ptolemies seems to have encouraged rather than to have checked the progress of literature in Egypt. Plutarch tells us (*Vit. Anton.*, c. 27), that Cleopatra spoke several barbaric languages fluently, and though he does not expressly mention the Egyptian, there can hardly be a doubt that it was among the number. Egypt lost much of its consequence when it became a Roman province; and when Alexandria ceased to be a royal residence, arts and literature would naturally fall into decay. Another cause which proved fatal to Egyptian literature was the early introduction of Christianity into Egypt. This event which contributed to extend the study of Greek literature and the use of the Greek language, at the same time deprived the antient literature of the country, as chiefly connected with the old religion, of the better part of its interest. Nor have intentional measures for destroying Egyptian books been wanting. The Emperor Severus collected as many of the Egyptian writings relative to the mysteries of the priests as he could obtain, and buried them in the tomb of Alexander (*Dion. Cass.*, lxxv., c. 13); and Diocletian ordered all books on alchemy to be destroyed, from an apprehension that by the cultivation of that science the Egyptians might again become wealthy, and thus find means to shake off their allegiance to the Roman empire. (Suidas, v. χημεία and Διοκλητιανός.) Notwithstanding these unfavourable circumstances, the language of the country continued in ordinary use, particularly in the interior provinces. Many hermits in the desert of Thebaïs, and many bishops of Upper and Lower Egypt, knew no other language; and the Egyptian, or as it is more appropriately called during these later times, the Coptic language survived for seven or eight centuries after the conquest of Egypt by the Arabs. We cannot be surprised if at last it entirely disappeared. Vexations of all kinds, religious persecutions, banishments, massacres, and devastations by fire and sword, had from century to century thinned the native population of the country, which had in the same proportion been replenished by settlers from different Arabic tribes of Africa and Asia. In the same manner the Coptic language gradually gave way to the Arabic, which is now the language generally in use throughout Egypt.

The literature extant in the Coptic language is by no means rich. The only part of any intrinsic value seem to be the Coptic translations of the Bible, probably made towards the close of the third and in the beginning of the fourth century, and following, as far as the Old Testament is concerned, the Septuagint version, the readings of which, as well as those of the Alexandrine text of the New Testament, they may serve to determine. Besides these, there exist Coptic translations of sermons from the Greek fathers, fragments of the decrees of councils, likewise generally translated from the Greek, liturgies, acts of martyrs, original mystic treatises on ethics, with numerous examples from the lives of pious hermits, and translations from the Greek of some apocryphal books of the New Testament. Coptic literature offers little or nothing of sufficient interest in itself to make the study of the Coptic language attractive; and, except its use in biblical criticism, its study is of importance only as furnishing the only means by which the inquiry into the hieroglyphic records of antient Egypt may with any chance of success be approached.

Such as we find it, the Coptic language exhibits evident traces of the fate of the country in which it was spoken. Under the Ptolemies, and afterwards under the Romans, new forms of government and administration were introduced into Egypt; and the inhabitants necessarily borrowed from their conquerors the names of public offices and other terms relating to political matters. The Coptic language received a further supply of foreign words in consequence of the introduction of Christianity. A great number of Greek words were retained in the Coptic versions, partly it seems from an apprehension of profaning the Christian doctrine by venturing to translate expressions deemed peculiarly holy in the Greek original text; but doubtless, in a great measure, also from ignorance or laziness, or from a desire to display learning by the use of Greek words. It has been remarked, that the proportion of Greek expressions is not the same in all Coptic writings; and that only a few occur, for which equivalents might not be found among the genuine Coptic words.

It is well known that the antient Egyptians, besides the hieroglyphics, possessed an alphabet or syllabic system of writing of their own. In the modern Coptic we find the Greek alphabet employed, with eight new letters added to it, to express certain articulations peculiar to the Copts. It is uncertain at what period the Greek alphabet came into use.

Athanasius, bishop of Kous, in an Arabic treatise on the grammar of the Coptic language, a manuscript of which is preserved in the Royal Library at Paris, informs us that there were three dialects of Coptic; namely, the dialect of Misr or Upper Egypt, commonly called the Sahidic; the Bahiric, so denominated from Bahirah, or Lower Egypt, and usually called the Memphitic; and the Bashmuric, spoken in the district of Bashmur, in the Delta. In the Bahiric, or Memphitic dialect, as well as in the Sahidic, we possess manuscripts of nearly the whole of the Bible and of the services of the Coptic church, besides some other less important works; but in the Bashmuric dialect only a few fragments have hitherto been discovered and published. The character common to all these dialects is that of a language which, having lost its original power of expressing by grammatical inflection the relations of notions in sentences, has, like most other modern languages, resorted to particles and auxiliary words to supply that deficiency. The precision with which these auxiliary words are employed, and the extent to which they can be combined in forming derivative words, are remarkable, and may well be compared with the use of letters and other symbols in an algebraical formula. The plural of nouns is distinguished from the singular by a monosyllabic prefix; the genders of substantives are seldom marked by a peculiar termination, but are determined either by the article, or by the addition of a word implying 'male' and 'female.' There are no terminations of case; and all changes of declension must be expressed by means of particles. There is a definite and an indefinite article. The definite article has in the singular distinct forms for the masculine and feminine genders, but does not distinguish the gender in the plural; the indefinite article admits of a distinction of number only. The degrees of comparison are expressed by subjoining auxiliary words to the adjective. The personal pronouns are almost the only part of speech that has preserved some traces of inflection: besides these, the Coptic has separate forms for the possessive, the demonstrative, the relative, and the interrogative pronouns, and it has pronominal suffixes and insertions (infixes) which are applied to nominal and verbal inflexions. Ordinal numbers are formed by prefixing various auxiliary words to the cardinal numbers. The verb has only an active voice, and the passive must be expressed by circumlocution, usually by the third person of the plural (as in Latin, *ferunt* = *fertur*, or in English, *they say* = *it is said*.) The imperative generally exhibits the root of the verb in its pure state. The conjugation of verbs is accomplished by adding pronominal prefixes to the root, which vary to a certain extent in the different tenses; if a verb in the third person singular is preceded by a relative pronoun, its pronominal prefix is usually dropped; there are no participles in the strict sense of that term. The number of prepositions in the Coptic language is considerable.

Of the three dialects, the Memphitic, Sahidic, and Bashmuric, the first appears to be the most polished. The Sahidic has admitted a greater number of Greek expressions. Words which in Memphitic end in *i*, have in Sahidic *e* for their termination. The Sahidic substitutes the sound *h* for the Memphitic *kh*, and the tenues π, κ, τ, for the aspiratæ θ, χ, ϑ, also sometimes *ou* for ω, and *sh* for *j*. The Bashmuric agrees with the Sahidic in preferring the tenues π, κ, τ, to the corresponding aspiratæ, and *h* to *kh*; moreover, it substitutes the vowel *a* for the Memphitic *o*, and *e* for the Memphitic *a*, *ei* often for *i*, *au* for *ου*, *b* for *f*, and particularly *l* for *r*.

(Henry Tattam, *A Compendious Grammar of the*

Egyptian Language, London, 1830, 8vo., and *Lexicon Ægyptiaco-Latinum*, Oxford, 1835, 8vo.; Am. Peyron, *Lexicon Linguæ Copticæ*, Turin, 1835, 4to.; Quatremère, *Récherches Critiques et Historiques sur la Langue et la Littérature de l'Egypte*, Paris, 1808, 8vo.)

COPULA. In logic the word copula means the term which connects the subject with its predicate, as in the sentences 'I *am* a Christian,' and 'the tree *is* green,' the expressions 'I' and 'tree' respectively denote the subject, and the verbs 'am' and 'is' serve for the copula.

Philosophers have endeavoured to explain how the copula effects by its interposition one judgment of two ideas, and forms it into a whole. The erroneous modern theories of philosophers otherwise celebrated, such as Kant and Fichte, on this obscure part of metaphysics, greatly influenced the whole of their systems. The following remarks will be found calculated to elucidate this interesting topic.

Knowledge and science consist in the transferring of the truth in nature (in the universe, including the mind and even what is logically possible) to the sphere of human perception; and the whole universe may thus be converted into a countless number of real and lasting impressions. To effect this there must be faculties as numerous as there are classes of truth in nature. Of the latter there is, 1st, the truth of the *identity* of things: every thing resembles and corresponds to itself. This appears so plain that it might be deemed superfluous to mention it, the contrary being indeed impossible. But such is the case in every instance of truth, though each particular instance is not so apparent as this fundamental axiom of A = A. 2ndly, The truth of *unity* in the variety of things—things differ in their accidents, but are substantially the same; for instance, all trees are comprised under the same idea of trees, but they differ in their accidents, such as leaves, flowers, fruits, &c. 3rdly, the truth of *synthesis* of substance and accident—accidents are found closely blended with substance; for instance, in a mineral we cannot separate its colour, gravity, crystalline form, taste, &c.: we cannot put the substance in one place and the accidents in another. 4thly, The truth of *cause* and *effect*—each effect has its cause. 5thly, The truth of *relations of aptness* and *progress* in nature. 6thly, The truth that there exists in nature the *infinitely small*. 7thly, The truth that in nature there is the *infinitely great*. First existed nature with its truth; next creatures existed, and received their faculties of perceiving certain descriptions of truth. Plants are destitute of those faculties; animals in general possess two; those animals which form the transition to man have three; and man has five. In the Deity alone can the whole seven be united.

The first faculty (of perceiving the identity of things) is that of *consciousness* in its general acceptation. It grows into memory, when the brain is developed. (Imagination or phantasy arises from spontaneity, and has no truth in nature corresponding to itself; it is the faculty of blending what is merely probable, and its product is art.) The second faculty is that of *abstraction*, by which unity is perceived in the variety of things: it is found in all animals that have a brain. 3rdly, The faculty of *relation* (intellect), effecting by means of the copula a judgment, in which substance and accidence (in logic called subject and predicate) are connected. As mysterious as this connection is in nature, so mysterious is the copula: the instrument by which the process is performed is the brain. The fourth faculty is that of *drawing conclusions*, or of forming from two judgments (A is B, B is C) a third (C is A). This faculty leads to a communicative language; man only possesses it, and therefore he only, even when deaf and dumb, is capable of speaking. This faculty forms the solitary and certainly important difference between man and the superior animals which form the transition to man. By means of this faculty, man readily attains the fifth, namely, that of discovering *the relation of aptness in nature*; these relations are *ideas*, whence this faculty is called the faculty of *idealizing*. The seventh faculty, of forming an idea of the *infinitely great*, can be attributed to an Almighty God alone. In opposition to what we have explained, the system of Kant asserts, that we cannot know whether or not the truth referred to exists in nature, which we construe merely from our intuitive and mental powers, and which therefore may turn out to be different from what it appears to us.

COPYHOLD, a term in English law applied to lands held by what is called tenure by copy of court roll, the nature of which is thus described by Littleton (§ 73, 4, 5): 'Tenant by copy of court roll is as if a man be seised of a manor, within which manor there is a custom which hath been used time out of mind of man, that certain tenants within the same manor have used to have lands and tenements to hold to them and their heirs in fee-simple or fee-tail, or for term of life, at the will of the lord, according to the custom of the same manor. And such a tenant may not alien his land by deed, for then the lord may enter as into a thing forfeited unto him. But if he will alien his land to another, it behoveth him after the custom to surrender the tenements in court into the hands of the lord to the use of him that shall have the estate. And these tenants are called tenants by copy of court roll, because they have no other evidence concerning their tenements, but only the copies of court rolls.' From this it appears that the title to copyhold lands is not only modified but altogether constituted by custom; subject to the estates in them which the custom confers they are held by the lord under the common law as part of the demesnes of his manor. For these customary estates were in their origin mere tenancies at will, though by long indulgence they have in many instances acquired the character of a permanent inheritance descendible (except where otherwise modified by custom) according to the rules of the common law; and as tenancies at will they continue to be considered in all questions relating to the *legal* as distinguished from the customary property in the land.

The origin of copyholds is involved in great obscurity. The opinion generally adopted among our lawyers and antiquarians, and supported by the authority of Littleton, Coke, Sir Martin Wright, and Mr. Justice Blackstone, is, that copyholders have gradually arisen out of the villeins or tenants in villeinage who composed the mass of the agricultural population of England for some centuries after the Norman conquest, through the commutation of base services into specific rents either in money or money's-worth. (See Co. Litt., 58 a—61 a; Blackstone's *Comm.*, ii., p. 92; Wright *on Tenures*, 3rd edit., p. 215.) See also Hallam's *Middle Ages*, vol. iii., p. 254. [VILLEINAGE.]

Although the revolution in the condition of these classes of persons was accomplished gradually, it seems in the middle of the 13th century to have begun to assume a more decided character. There are proofs of as early a date as the reign of Henry III. of a limitation of the services of villeins to certain specified acts which were recorded in the lord's book. The descendants of persons so privileged began to claim a customary right to be entered on the court roll on the same terms as their predecessors, and, in process of time, prevailed so far as to obtain a copy of the roll for their security. It is said in the year-book of the 42nd of Edw. III. to be 'admitted for clear law that if the customary tenant or copyholder did not perform his services the lord might seize his land as forfeited,' which seems to imply a permanent interest in the copyholder, so long as he performed the services. This view of the law is confirmed by Britton in a passage cited by Lord Coke (Co. Litt., 61 a), and was adopted by the judges in Edward IV.'s time, who held that a copyholder might maintain an action of trespass against the lord for dispossession.

The two great essentials of copyhold tenure, according to Blackstone, are: 1. That lands be parcel of and situate within that manor under which they are held; and 2. That they have been demised or demisable by copy of court roll immemorially. 'For immemorial custom, says that author, ii., p. 96, is the life of all tenures by copy; so that no new copyhold can, strictly speaking, be granted at this day.'

The burdens to which a copyhold tenure is liable in common with free tenures, are fealty, services, reliefs, and escheats; besides which it has certain liabilities peculiar to itself in the shape of heriots and fines. A heriot is the render of the best beast or other chattel (as the custom may be) to the lord on the death of a tenant.

Of fines, some are due on the death of a tenant and others on the alienation of the land; they are sometimes fixed by the custom, sometimes arbitrary; but in the latter case it is an established rule of law that the lord cannot demand by way of fine upon the descent or alienation of the land more than the amount of two years improved value of the property, after deduction of the quit-rents to which it is liable. The ordinary mode of alienating a copyhold estate in fee-simple is by *surrender and admittance*, which is effected in the following manner:—The copyholder appears in court and professes to surrender or deliver up his land to the lord (either in person, or which is more usual, as repre-

sented by his steward), expressing the surrender to be to the use of A, and his heirs; and thereupon A is *admitted* tenant of the land to hold it to him and his heirs at the will of the lord according to the custom of the manor. He then pays a fine, and also (if required) does fealty. All these circumstances, or at least the surrender and admittance are entered on the court rolls; and the new tenant, paying his fees to the steward, receives a copy of this fundamental document of his title. Surrenders are made in various forms, as by the delivery of a rod, glove, or other symbol, to the steward or other person taking the surrender. Surrenders may also be made to the lord ... person out of court; to the steward; and by special custom to the lord's bailiff; to two or three copyholders, or into the hands of a tenant in the presence of other persons. But when a surrender is taken out of court it must be presented by the homage or jury of copyholders at the next general court, except where a special custom authorizes a presentment at some other court. Admittances also may be made out of court and even out of the manor.

The words in the admittance 'to hold at the will of the lord,' are characteristic of those customary estates to which the term copyhold is in ordinary legal language exclusively appropriated, in contradistinction to what are sometimes called 'customary freeholds' (which estates are very common in the north of England), and antient demesne lands. These are all included under the term copyhold in the statute 12 Car. II. c. 24, which abolished all the old tenures in England except common soccage, copyhold, and some other specified tenures. Though customary freeholds and antient demesne lands for the most part pass by surrender and admittance, the admittance is expressed to be 'to hold according to the custom of the manor.'

The Statutes of Wills (32 Henry VIII. c. 1, and 34 and 35 Henry VIII. c. 5) do not include copyholds, and therefore formerly it was necessary in order to enable a person to dispose of copyholds by will that he should first have surrendered them 'to the use of his will,' as it was called. This ceremony was rendered unnecessary by the statute 55 Geo. III. c. 192, which however does not extend to customary freeholds. A devise of copyholds by will may be made without observing the formalities prescribed by the statute of frauds (29 Car. II. c. 3), the terms of that statute not extending to copyholds. The Statute of Entails (13 Ed. I.), commonly called the Statute of Westminster the 2d, does not extend to copyholds; but in most manors a custom of entailing copyholds has prevailed. These entails might formerly be barred by a proceeding in the Lord's Court, analogous to a common recovery, or in the absence of a custom authorizing such a proceeding, by a mere surrender. And now by statute (3 & 4 Wm. IV. c. 74, § 50-54 inclusive) entails of copyholds may be barred by assurances made in pursuance of the provisions of that act. It is a general rule that no statute relating to lands or tenements in which those of a customary tenure are not expressly mentioned, shall be applied to customary estates, if such application would be derogatory to the customary rights of the lord or tenant. Hence neither the provision in the Stat. of Westm. the 2d, (13 Ed. I. c. 18) rendering debtors' lands liable to process of execution by writ of elegit, nor the Statute of Uses (27 Henry VIII. c. 10), nor the Statutes of Partition (31 Henry VIII. c. 1, and 32 Henry VIII. c. 32), nor the statute enabling persons having certain limited interests in lands, to grant valid leases (32 Henry VIII. c. 28), nor any of the local Registry Acts are applicable to copyholds.

Copyholds cannot be seized upon an outlawry, nor are they assets for payment of specialty debts at law, nor are they even liable for debts due to the crown, although they have always been subject to sequestration under the decree of a court of equity. But copyhold lands belonging to traders have been subjected to the operation of the bankrupt laws (v. stat. 6 Geo. IV. c. 16, sec. 68 and 69; 3 and 4 Wm. IV. c. 74, sec. 66;) and by stat. 3 and 4 Wm. IV. c. 104, copyhold lands of all persons whatever which have not been devised for payment of debts, are rendered assets to be administered in a court of equity for the payment of specialty and simple contract debts. Copyholds are not liable (except by special custom) to the incidents of curtesy or dower. The latter, where authorized by the custom, is called the widow's 'free bench.' These estates being considered continuations of that of the deceased tenant, are perfected without admittance. A purchaser or devisee of copyholds has an incomplete title until admittance; but the customary heir is so far legal owner of the land *before admittance* that he can surrender or devise it, or maintain an action of trespass or ejectment in respect of it. The lord may by a temporary seizure of the land compel an heir or devisee to come in and be admitted; and he is himself compellable by a mandamus of the Court of King's Bench to admit any tenant, whether claiming by descent or otherwise.

By the general custom of all manors, every copyholder may make a lease for any term of years, if he can obtain a license from the lord, and even without such license he may demise for one year, and in some manors for a longer term, and the interest thus created is not of a customary nature, but a legal estate for years, of the same kind as if it had been created out of a freehold interest. But every demise without license for a longer period than the custom warrants, and in general, every alienation contrary to the nature of customary tenure, as a feoffment with livery of seisin, is followed by a forfeiture to the lord. A copyhold estate may also be forfeited by waste; as by cutting down timber, or opening mines, when such acts are not warranted by the custom. In the absence of such special custom, the general rule seems to be that the right of property both in trees and mines, belongs to the lord, while only a possessory interest is vested in the tenant; but neither can the lord without the consent of the tenant, nor the tenant without the license of the lord, cut down trees, or open and work new mines. In like manner forfeiture may be incurred by an inclosure or other alteration of the boundaries of an estate, refusal to attend the customary courts, or to perform the services, or to pay the rent or fine incident to the tenure. The 9th section of the 1st Wm. IV. c. 65, protects infants, lunatics, and married women from the last mentioned cause of forfeiture. In case of felony or treason being committed by a copyholder, the lord has the absolute benefit of the forfeiture, unless it has been expressly provided otherwise by act of parliament. In all cases of forfeiture the lord may recover the forfeited estate by ejectment, without prejudice to the rights of the copyholders (if any there be) in reversion or remainder. He may waive the forfeiture by a subsequent act of recognition of the tenure. If he does not take advantage of the forfeiture for twenty years, his right to do so is barred by the act for the Limitation of Actions, 3 and 4 Wm. IV. And if he neglect to take advantage of the forfeiture in his life-time, his heir cannot avail himself of it.

The lord may also become entitled to a customary tenement by escheat for want of heirs. Formerly where a copyhold was surrendered to a mortgagee and his heirs, and no condition was expressed in the surrender, and the mortgagee died intestate and without an heir, the lord was entitled to enter for escheat. To remedy this, the 4 & 5 Wm. IV. c. 23, enacts that where a trustee or mortgagee of lands of any tenure whatsoever, dies without an heir, the Court of Chancery may appoint a person to convey or surrender the legal estate for the benefit of the persons entitled to the equitable interest in the property, and provides against the future escheat or forfeiture of lands by reason of the attainder or conviction of trustees or mortgagees who have no beneficial interest therein.

If the lord (having acquired a copyhold tenement by forfeiture, escheat, or surrender to his own use) afterwards grant it away by an assurance unauthorized by the custom, the customary tenure is for ever destroyed. And if he makes a legal conveyance in fee-simple of a copyhold tenement to the tenant, the tenement is said to be enfranchised, *i. e.* converted into freehold.

Copyholders were till very lately incapable of serving on juries, or voting at county elections of members of parliament; but the former disability was removed by 6 Geo. IV. c. 50, sec. 1, and the latter by the 2 & 3 Wm. IV. c. 45, sec. 19. As to the qualification for killing game under 22 and 23 Car. II. c. 25, sec. 3, there seems to be no distinction between freeholders and copyholders.

There are no lands of a copyhold tenure in Ireland.

End of Volume the Seventh.

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